NATIONAL COMMISSION ON AGRICULTURE
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RAINFALL AND CROPPING PATTERNS

Volume XIV

TAMIL NADU

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE AND IRRIGATION
NEW DELHI

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RAINFALL AND CROPPING PATTERNS—STATE SERIES

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RAINFALL AND CROPPING PATTERNS

TAMIL NADU

INTRODUCTION

1.1 The human population of the country is estimated to rise from the 1971 Census figure of 548 million to 935 million in 2000 AD. This rise calls for increased production. Land resources being limited emphasis has to be placed on increasing productivity per unit area. Temperature and other climatic conditions being favourable for crop production throughout the year over most parts of the country, it is possible to grow more than one crop in a year provided water, tne most important input, is available. In some parts of the country, the rainy season is long enough to provide scope for double cropping. This potential is yet to be fully exploited. There is scope for increasing irrigation resources in the country, but our estimates show that the area under irrigation is not expected to be more than 42 per cent of the total cropped area even in 2000 AD as against 22 per cent in 1970-71. Therefore, judicious utilisation of direct rainfall and irrigation water, singly and in combination, will have to be thought of for increasing production.

1.2 Farming technology has so advanced that it is possible to increase crop yields even under rainfed conditions, but the choice of crops would have to depend upon the amount and distribution of the prevailing rainfall. Additionally, it will be necessary that the maximum possible quantity of rain water is conserved in ponds and pools situated either within the farm area or elsewhere, in soil profiles and underground storages so that the same could be readily used to save crops in times of water stress. Not only in rainfed farming but even under irrigated conditions, one will have to plan for the most economic and efficient use of water so as to derive maximum possible benefit from rainfall and reduce dependence on irrigation. This necessitates a close study of the existing cropping patterns vis-a-vis rainfall patterns aimed at determining the nature of changes needed in the former. The cropping patterns depend primarily on the soil and climatic factors but the evolution of a cropping pattern in course of time is the combined effect of soil, climate, food habits and requirements and economic factors. In the context of increasing production, it is necessary to examine the cropping patterns from a scientific angle and find out possible alternative patterns having higher potential. Accordingly, the Commissions undertook a comprehensive study of the rainfall and cropping patterns of the country using taluk or tehsil as unit of area. It covered several other relevant factors such as orography, land use data, human and livestock populations, soil and climate, the object being to make, as far as possible an integrated assessment.

1.3 Chapter 14 on Rainfall and Cropping patterns of the Commission's Report presents a consolidated account of the data collected together with analysis of their inter-relationships on all-India basis. In this analysis, the Commission has been greatly benefited by the discussions with the concerned officers of State Governments. It was realised that by condensing the vast amount of information collected from each State into the small space of a chapter, many important and peculiar features of individual States were likely to be missed and hence the data and analysis of each State have been presented in separate volumes. The manner of presentation is similar to Chapter 14. It has also been considered desirable to include in each State volume the methodology and suggestions for future cropping patterns, which are practically the same as given in Chapter 14.

2 METHODOLOGY

2.1 The chief features of the study are (a) use of taluk or tehsil as unit of area for all basic data and analysis; (b) introduction of coded numerical forms to express patterns of distribution of monthly rainfall throughout the year, crops and livestock; (c) inclusion of information on orography, temperature, evapotranspiration, rainfall soil, irrigation, land use, human and livestock populations and yield performance of crops, all of which influence in different ways and degrees the cropping patterns of a place and (d) presentation of coded information on rainfall, crops and livestock on 1 : 1 million scale maps.

Rainfall Patterns

2.2 A major feature of India rainfall is that the southwest monsoon season (June to September) accounts for 70 to 95 per cent of the annual rainfall throughout the country except in the south east peninsula and Kashmir and adjoining hill areas. The monsoon as well as the annual rainfall show large fluctuations from year to year but, as stated in Chapter 13 on Climate and Agriculture, there is no significant evidence of any trend or periodicity in either of them. Considered in relation to crop production, the total annual or seasonal rainfall does not have much significance and what is important is its distribution during the

period of growth of different crops. A relevant question, therefore, is whether rainfall should be examined on a weekly, fortnightly or monthly basis. The coefficient of variation (CV) of monthly rainfall is as high as 40-50 per cent even in the rainiest month of July over most of the central, northern and eastern India. In the south excluding the west coast, CV is higher and varies from 60 to 100 per cent. The variability of weekly or fortnightly rainfall being still greater, makes the use of either of them undependable as indicators of rainfall distribution. For a macro-study like the present, monthly rainfall data which are more dependable and also the most convenient to handle have been used.

2.3 In order to relate crop production with rainfall, certain norms have to be assumed depending on the duration of the crops and their water requirements. On the basis of available information and the fact that most crops mature in about 90 days, the following broad norms have been drawn up :

(i) Rainfall greater than 30 cm per month (cm pm) for at least three consecutive months would be suitable for a crop like paddy whose water need is very high.

(ii) 20-30 cm pm for not less than three consecutive months would be suitable for crops whose water need is high but less than that of paddy, for example, maize and black gram.

(iii) 10-20 cm pm for at least three consecutive months would be suitable for crops requiring much less water, e.g., bajra and small millets.

(iv) 5-10 cm pm for three consecutive months would be just sufficient for crops which have low water requirements, e.g., moth (*P. aconitifolius*) and ephemeral grasses.

(v) Rainfall less than 5 cm pm for three consecutive months is not of much significance for crop production.

2.4 For denoting the year's rainfall distribution using monthly totals, a convenient code in letter symbols with numerical subscripts explained below, has been evolved. The letters A to E in Table 1 indicate the ranges of monthly rainfall and the subscripts to these refer to the number of months having these ranges of rainfall e.g. A_2 indicates two months with rainfall greater than 30 cm pm. The ranges correspond to those stated in the preceding paragraph.

TABLE 1

Code for Rainfall Data

Symbol	Monthly rainfall cm pm
A+	Greater than 30
B	20—30
C	10—20
D*	5—10
E*	Less than 5

+An examination of monthly rainfall in the country shows that except for areas in the west coast and some hill stations in extreme north-east, normal monthly rainfall seldom exceeds 40 cm.

*In distributions containing ranges of rainfall covered by A or B termed briefly as A & B types amounts less than 10 cm are not so significant and their frequency is generally small. To reduce the number of combinations, D is omitted in A or B type distributions, instead E is used to denote less than 10 cm pm. Thus B_2E_2 would denote two months of 20-30 cm pm and two months less than 10 cm pm rainfall.

The southwest monsoon months of June to September being the principal rainy season dominate the rainfall distributions of the country. To indicate the season's importance, monthly rainfall distribution during June to September is shown in brackets in the annual pattern. To the right of the bracket is the distribution for the post-monsoon months, namely, October to January and to the left that for the pre-monsoon months namely, February to May. In order to explain how such a coded rainfall distribution written in symbols with numerical subscripts has to be interpreted, a hypothetical example may be considered. D_1 E_3 (A_2 B_1 C_1) C_1 D_3, in which for each of the three periods, the symbols are in order of decreasing rainfall which is not necessarily the calendar sequence, can be explained as under :

(i) D_1 E_3 represents the period February to May in which one month's rainfall (usually May) is in the range of 5-10 cm and the remaining three months get less than 5 cm pm.

(ii) A_2 B_1 C_1 represents the period June to September, in which two months (usually July and August) get more than 30 cm pm rainfall, one month (September) gets 20-30 cm and the remaining month, i.e. June gets 10-20 cm.

(iii) C_1 D_3 represents the period October to January in which October gets 10-20 cm rainfall and the rest 5-10 cm pm.

Boundaries of Rainfall Zones

2.5 Since differences in monthly, seasonal and annual rainfall are not large within short distances, linear interpolation of rainfall data is permissible. Rainfall data being point measurements, isolines for the same or nearly the same type of distribution of monthly rainfall can, therefore, be drawn. These isolines may not necessarily follow the boundaries of taluks which are taken to be unit of area in this study and hence for

delineation of boundaries the following procedure has been adopted :

(i) Where variations are small, isolines follow the taluk boundaries;

(ii) where variations are large, isolines delineate the zone boundaries; and

(iii) any taluk, more than three quarters of which lies outside of a zone is not considered a part of that zone.

2.6 If an identical distribution is observed over two or more adjacent taluks a pattern is said to have evolved and the area covered by it distinguished as a zone and indicated suitably by a Roman numeral. Rainfall patterns have been identified for the whole country using the methodology described above. The data used for the analysis are the monthly normals of rainfall (1901 to 1950)[1] and the patterns and zones and depicted on all-India map which forms part of Chapter 14 on Rainfall and Cropping Patterns of the Commission's Report.

Cropping Patterns

2.7 The basic data for the study of cropping patterns of the country are the areas under different crops in each of the taluks. A large number of crops are grown in a taluk but most of them occupy small areas, often less than one per cent of the total cropped areas of the taluk. With a view to limiting the number of crops constituting a pattern only those crops are considered which individually occupy 10 per cent or more of the gross cropped area of the taluk. In this process, several crops have to be excluded, even though they may be otherwise important. The minimum limit has been fixed at 70 per cent, so that the number of crops, which together cover at least 70 per cent of the gross cropped area, and in which none occupies less than 10 per cent, is not large. Trial computations have shown that in such distributions any crop occupying more than 10 per cent area is rarely omitted and the number of crops hardly exceeds five. When the same distribution holds good for two or more adjacent taluks, a pattern is obtained.

2.8 As in the case of rainfall, percentage area coverage by crops is expressed by means of numerical subscripts affixed to crop symbols shown in Table 2. The list of crops given below is comprehensive and will hold good for all the States.

TABLE 2

Crop Symbols and Area Intervals

Crop	Symbol
1 rice	Pd
2 wheat	W
3 jowar (kharif)	Jk
4 jowar (rabi)	Jr
5 bajra	B
6 maize	M
7 ragi	R
8 small millets	Mt
9 barley	Ba

TABLE 2 (*Contd.*)

Crop	Symbol
10 oats	Oa
11 gram	G
12 pigeonpea (tur)	T
13 pulses other than pigeonpea and gram	Pu
14 groundnut	Gn
15 oilseeds other than groundnut	O
16 cotton	C
17 jute	Ju
18 other fibres	Fb
19 sugarcane	S
20 potato	Pt
21 vegetables	V
22 fruits	Fr
23 tapioca	Ta
24 plantations	L
25 fodder	F
26 chillies	Ch
27 tobacco	To

Area interval (per cent)	*Subscript*
70 or more	1
50—70	2
30—50	3
10—30	4
less than 10	5

The crop code contains the crop symbol and the appropriate subscript. In writing crop distribution the first crop has always the highest area but the rest may not necessarily follow the order of decreasing areas. For example, crop distribution, C_3 Jr_4 Mt_4, means that cotton area is 30-51 per cent, and jowar rabi and millets each occupies 10-30 per cent of the gross cropped area, the total being 70 per cent or more. Two or more taluks having the same distribution of crops constitute a pattern. Cropping patterns so derived have been indicated on maps of 1 : 1 million size.

Relative Yield Index of Crops

2.9 Besides the absolute figures the yield of a crop has also been expressed as per cent of all-India average which is called Relative Yield Index (RYI). Relative Yield Index Values have been computed for the principal crops on the basis of (1968-69 to 1970-71) data available in the records of the Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation.

Livestock Patterns

2.10 The livestock patterns are relevant only insofar as these are related to production of fodder and feeds. As talukwise data were not available for the livestock Census, 1972, those of 1966 Census as published by the States have been used. The animals considered for livestock analysis are shown in Table 3 together with their symbols.

1 *Memoirs of India Meteorological Department*, Volume XXXI, Part 3, 1962.

TABLE 3

Livestock Symbols

Category	Symbol
Cattle:	
male (over 3 years)	Cm
female (over 3 years)	Cf
young stock (under 3 years)	Cy
buffaloes:	
male (over 3 years)	Bm
female (over 3 years)	Bf
young stock (under 3 years)	By
sheep	S
goats	G
horses, mules and ponies	H
donkeys	D
camels	Ca
pigs	P

The livestock patterns are expressed in coded from in the same manner as the cropping patterns.

Soils

2.11 Soil data on a taluk basis are not available for all the areas of the country. As such, soils have been discussed in a general manner using the traditional nomenclature in describing their characteristics.

Other Data

2.12 The sources of other data featuring in the study are given below :

item	*source*
taluk area	States' Census Reports 1971 or from the data furnished by the States in their land-use returns.
orography	maps of the Survey of India and National Atlas Organisation
temperature	Climatological Tables of observatories in India. India Meteorological Department, 1931-1960 normals
evapotranspiration	scientific Report No. 136 of the India Meteorological Department, 1971
human population	Consus of India, 1971
irrigation and land use statistics	basic data pertaining to land utilisation statistics obtained from the States and refer mostly to 1969-60

Presentation of Information

2.13 The tables required for following the text are given in the text itself at appropriate places, whereas the basic data are appended as follows :

APPENDIX 1	Talukwise Land Use (1969-70) and Population Statistics. (arranged according to State rainfall zones)
APPENDIX 2	Talukwise Livestock Population-1966 (arranged according to State rainfall zones)
APPENDIX 3	Zonewise Information on Rainfall, Rainy days and Cropping Patterns.
APPENDIX 4	Zonewise area under Principal Crops (Per cent of Gross Cropped Area)

2.14 Rainfall, cropping and livestock patterns of each State are indicated on maps in the 1 : 1 million scale and given in Appendices 5, 6 and 7 respectively. In the case of rainfall patterns, the zonal numbers in State maps have been given in Roman numerals and their all-India equivalents as used in Chapter 14 of the Commission's Report have been shown in three digit Arabic numerals within brackets.

3 GENERAL FEATURES

3.1 The area of Tamil Nadu State is 1,30,069 sq km. It has 14 districts. Besides Madras, which is a city district of 128 sq km, Kanyakumari has the lowest area of 1,684 sq km. Coimbatore is the largest district with an area of 15,673 sq km. The frequency distribution of districts according to size is given below :

area sq km	ess than or equal to 2000	2001—4000	40001—6000	6001—8000
no. of districts	1	1	—	1
area sq km	8001—10,000	10001—12,000	12001—14,000	14001—16,000
no. of districts	3	2	3	2

The total number of taluks is 115, including the Madras taluk. The average area of a taluk in the State is 1,100 sq km, areas of individual taluks varying from less than 200 sq km to 2,800 sq km.

3.2 The State of Tamil Nadu lies between 8°5′ and 13° 35′ Lat. N and 76°15′ and 80° 20′ long E. It has a long coast line of about 1,000 km. The western edge of the State is the Western Ghats rising at places to over 2000 masl (metres above sea level). Almost the entire eastern half of the State is below 150 masl. In the coastal districts, the height variations are less than 80 metres. The rest of the State consists of mostly upland plains, where the maximum elevation reached is generally below 600 masl. There are, however, pockets of mountainous areas. In the taluks of Kallakurichi, South Arcot, Salem, Rasipuram and Attur, Salem district, and from Denkanikottah to Gopichettipalayam, the maximum elevation reached is 1,300 to 1,500 masl. Nilgiris is mostly a mountainous district with the highest peak of Doddabetta (2,637 masl) in Ootacamund taluk. From Coonoor southwards to Kodaikanal, the maximum elevation varies between 1,900 and 2,500 masl. Along the rest of the western boundary the maximum elevation is mostly 1500 masl, though in Srivilliputtur and Periyakulam, the range is 1800-2000 masl. Further southwards, it is mostly of the order of 1,500 masl. The mountainous area of the State is largely confined to the western and northwestern boundary and its width except in Nilgiris and Palani hills is nowhere significant.

Population

3.3 The population of Tamil Nadu State is 41.2 millions; population density at 317 per sq km being 75 per cent higher than the all-India figure. Madras city district has the highest population density of 19,293 per sq. km. The desity of the other districts is as follows :

density/sq km	151-200	201-300	301-400
no. of districts	2	4	6
density/sq km	401 500	501-750	
no. of districts	—	1	

Kanyakumari, the smallest district, has the highest density at 726. All the remaining districts have a density of less than 400. The rural population in the district is 70 per cent of the total. Excepting Nilgiris, the rural population exceeds 64 per cent of the total in other districts. Seventy five per cent of the taluks including sub-taluks are in the population density range of 200 to 500, 43 per cent of 200-300 and 15 per cent of less than 200. The density in the entire coastal belt exceeds 200.

Land Use

3.4 Fourteen per cent of the reporting area, in the State is under forests, 11 per cent under non-agricultural use, 12 per cent under fallow and 7 per cent under barren and unculturable land leaving 48 per cent as the net sown area. The coastal districts have hardly any forests. In the western districts and in Dharmapuri and North Arcot districts, more than 25 per cent area is under forests. Nilgiris has the highest area under forests (43 per cent). Ten taluks/sub-taluks have each more than 40 per cent area under forests, Kodaikanal (Madurai district) has 63 per cent, North Arcot district 40-60 per cent in four of its taluks, (the area under forests in Vellore taluk being 60 per cent. Area under forests in Gopichettiapalayam is 52 per cent. Area under non-agricultural use is 10-20 per cent in the coastal districts, the highest being in the districts of Chingleput and Thanjavur. Eleven per cent of the reporting area is under current fallows is Coimbatore, Ramanathapuram and Tirunelveli districts, the State average being 8 per cent. Total fallow (including current fallows) land constitutes more than 12 per cent of reporting area almost all over the State excepting Thanjavur (5 per cent), Nilgiris (3 per cent) and Kanyakumari (2 per cent). It is as high as 22 per cent in Tirunelveli district. The net sown area is highest in Thanjavur with 65 per cent. The percentage exceeds 50 in the coastal and adjoining districts of South Arcot, Salem, Tiruchirapalli, Ramanathapuram and Thanjavur. In all the other districts excluding Nilgiris, the percentage is between 40 and 50 and in Nilgiris 21. Two-thirds of the taluks and sub-taluks have net sown area exceeding 40 per cent, the highest being in Thanjavur district with four taluks having an average of 76 per cent and one of 72 per cent. There are only two other taluks, Tiruchengode of Salem district with 77 per cent and Aruppukottai in Ramanathapuram district with more than 70 per cent net sown area. The lowest net sown area is in Nilgiris with 15 per cent in Ootacamund and 19 per cent in Gudalur, Krishnagiri and Ambasumdram taluks have also less than 20 per cent net sown area. The State average for area sown more than once is 16 per cent being about 10 per cent in all the districts except Nilgiris and Ramanathapuram, which have an average of 1 per cent only. Table 4 gives districtwise land use statistics.

TABLE 4

Districtwise Land Use Statistics—1969-70

TAMIL NADU

(Per cent of reporting area)

District	Forest	Area under non-agri. uses	Barren & uncultivable waste	Permanent pastures & other grazing land	Misc. trees, groves, etc. not included in net area sown	Cultivable waste land	Fallow other than current	Current fallow	Net sown area
South Arcot	5·9	8·1	13·7	0·9	2·3	5·0	4·1	4·8	55·3
North Arcot	23·8	9·2	7·4	1·6	0·7	3·3	8·6	4·9	43·0
Salem	10·9	7·2	8·6	2·2	1·8	4·5	3·7	6·2	54·9
Chingleput	4·1	21·5	6·2	5·8	5·5	5·8	4·4	8·4	38·2
Ramanathapuram	3·7	17·3	4·4	0·4	0·5	7·0	5·1	10·9	50·7
Dharmapuri	27·1	8·2	8·2	1·3	0·3	1·1	0·9	4·5	46·4
Tirunelvelli	11·7	10·3	5·2	2·7	1·6	6·2	11·6	10·8	40·0
Nilgiris	42·8	4·6	13·3	3·5	3·1	8·7	1·4	1·7	21·0
Madurai	20·6	8·1	6·4	1·0	1·5	2·5	3·5	10·7	45·6
Kanyakumari	29·1	6·4	12·2	—	0·4	1·5	0·9	1·1	48·7
Coimbatore	25·9	4·9	3·2	1·2	0·4	2·0	4·1	11·2	46·1
Tiruchirapalli	7·0	15·2	4·7	2·6	1·2	6·8	4·6	6·3	51·6
Thanjavur	1·5	20·0	3·3	0·7	1·8	3·1	2·8	2·1	64·8
STATE	14·3	11·3	6·5	1·8	1·5	4·5	4·6	7·5	48·0

NOTE : The percentage figures have been rounded off individually and hence Cross totals may not, in some cases, add up to 100.

Soils

3.5 The costal belt excepting Thanjavur district, consists of coastal alluvium with small areas of costal sand in the eastern extremity of Ramanathapuram and Chidambaram taluks. In Thanjavur district, deltaic alluvium covers the northern part with laterite or gravelly laterite in the south. A narrow strip along the southern boundary of Tirutaraipundi taluk is having saline and alkaline soils. A thin strip along the coast is coastal sand. In areas adjoining the coastal belt, red loamy soils cover nearly half of South Arcot district and eastern third of Tiruchirapalli district with laterite in the south and red loamy soils in the north. In the rest of the State, red sandy soils dominate with pockets of red and black soils in Coimbatore, Madurai and Tirunelvelli districts, and red loamy soils in Coimbatore district. There are small patches of deep black soils also in Coimbatore district. Most of Nilgiris has red loamy soils. In Coimbatore district both calcareous and non-calcareous red soils predominate accounting for 57.5 per cent of the cultivable area.

Irrigation

3.6 Tamil Nadu is one of the few States in the country with a high percentage of irrigation, the State average for irrigated area being 43.6 per cent of the net area sown. Thanjavur district has under irrigation 91 to 96 per cent of the total cropped area in the seven northern and eastern taluks; followed by 2 taluks with 80 per cent and the remaining three with 64 per cent. Eight of the twelve taluks of Chingleput district have more than 60 per cent irrigated area, and three of the taluks of Chingleput, Saidapet and Tiruvallur have their entire cropped area irrigated mostly by tanks. The five southern taluks of Tirunelvelli district and the eastern two of Kanyakumari have 50 to 75 per cent irrigated area and 25 per cent taluks have less than 20 per cent area under irrigation. Canals account for over 90 per cent in Thanjavur, 60 per cent in Kanyakumari and 50 per cent in North Arcot and Coimbatore districts. Tanks play a major role in Ramanathapuram and Chingleput, irrigating 80 and 70 per cent of the area respectively. Tubewells are practically non-existent. In Chingleput, South Arcot and Tiruchirapalli districts, they contribute slightly less than 2 per cent of the total area. Well irrigation is highest in Salem with 70 per cent followed by 30 to 45 per cent in South Arcot, North Arcot, Dharmapuri, Coimbatore, Madurai, Tirunelvelli and Tiruchirapalli districts. Percentage of Irrigated area sourcewise and net irrigated area as percentage of net sown area are given in Table 5.

TABLE 5

Sourcewise Irrigated Area and Net Irrigated Area as Percentage of Net Sown Area—1969-70

(Per cent)

District	Canals	Tanks	Tubewells	Other wells used for irrigation	Wells supplementing other sources of irrigation	Other sources of irrigation	Net area irrigated to net sown area
Chingleput	2·4	71·2	1·7	15·4	8·0	1·3	77·7
Ramanathapuram	0·2	83·2	—	13·2	3·2	0·1	38·4
Dharmapuri	17·0	28·0	—	44·0	9·6	1·3	15·0
Coimbatore	48·8	2·0	—	41·6	6·1	1·4	35·3
Madurai	31·9	24·3	0·1	39·2	3·3	1·1	35·0
Kanyakumari	60·5	36·5	—	0·4	0·1	2·4	38·8
Nilgiris							
North Arcot	51·3	—	—	39·1	7·2	2·4	50·1
Tirunelvelli	12·8	50·0	—	32·3	4·1	0·9	34·7
South Arcot	26·8	37·6	1·8	30·2	—	3·6	48·5
Thanjavur	92·1	5·8	—	1·9	—	0·2	81·4
Salem	15·5	10·7	—	72·8	—	1·0	29·2
Tiruchirapalli	36·1	33·6	1·6	26·8	—	1·9	39·5
State	39·4	29·6	0·5	26·1	3·1	1·4	43·6

Rainfall

3.7 The average annual rainfall of the State is 101 cm in 54 rainy days. October and November are the months of heaviest rainfall contributing together nearly 40 per cent of the annual precipitation. Monthly and annual rainfall and values of coefficient of variation are given below :

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Rainfall (cms)	3·7	1·6	2·3	5·1	7·3	6·2	6·9	9·6	10·6	19·2	19·6	8·7	101
Per cent of annual	4	2	2	5	7	6	7	9	10	19	19	9	—
Coefficient of Variation (Percent)	109	117	89	57	47	27	38	37	35	37	48	82	14

Temperature

3.8 The normal annual maximum temperature varies between 31 and 34°C except at hill stations where it varies between 18 to 21°C. May is the month of maximum temperature except at coastal stations where June is hotter. The highest normal maximum temperatures are 37.38°C in the interior. July to September normals are uniform over large areas and the range of variation in these months at most of the stations is less than a degree. Normals during October are about 31-32°C and in November 29-30°C. December temperature is lower than November by less than a degree. Normal annual minimum temperature varies between 21 and 26°C. January is the coldest month of the year the range of temperature being 17 to 22° C; December temperature is close to January values, the difference being less than a degree. *The normal annual mean daily* temperature is mostly 28-29°C. It is highest in May except at coastal stations where June temperature is higher by a degree. Normals of May vary between 29 and 31°C and of June between 30 and 32.5°C; at coastal stations the normals are nearly the same *i.e.* 20-30°C in May and 31-32°C in June. The range of variation during July to September at the different stations is about a degree or less; mostly between 28 to 30°C. October normals generally range between 27 to 29°C and November 25 to 27°C. During December and January normals temperature remain practically steady ranging from 23 to 26°C. Tables 6 to 8 give the normals of daily maximum, minimum, and mean temperature at various stations in the State.

TABLE 6

Normals of Daily Maximum Temperature (°C)

Station	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Madras	28.3	29.7	31.7	33.3	35.6	36.5	34.4	33.9	33.5	31.5	29.2	28.2	32.2
Vellore	28.9	31.6	34.5	36.8	38.4	36.0	34.3	34.1	33.5	31.8	29.3	28.1	33.1
Tirupattur	29.5	32.5	35.4	36.5	36.5	34.9	32.4	33.4	32.9	30.6	28.9	28.4	32,7
Cuddalore	27.9	29.0	30.8	32.8	35.7	36.9	35.4	34.5	33.8	31.5	29.0	27.9	32.1
Kallakurichi	29.9	32.7	35.9	36.9	38.4	37.1	35.0	34.9	34.8	32.5	29.9	28.5	33.9
Salem	31.1	33.7	36.1	36.9	36.8	34.9	33.4	33.2	33.1	31.9	30.5	30.1	33.5
Coimbatore	29.7	32.2	34.7	34.6	33.5	30.5	29.0	29.9	30.7	30.4	29.3	28.9	31.1
Nagapattinum	27.7	28.7	30.3	32.5	35.5	36.6	35.3	34.4	33.7	31.4	28.9	27.7	31.9
Tiruchirapalli	30.1	32.7	35.1	36.7	37.1	36.4	35.5	35.1	34.2	32.3	29.9	29.3	33.7
Madurai	30.2	32.4	35.0	36.3	37.5	36.7	35.7	35.3	35.0	33.0	30.6	29.7	34.0
Tandi	29.2	29.8	30.7	32.0	33.3	33.3	33.1	32.7	32.8	31.0	29.7	29.5	31.4
Pamban	28.0	29.1	30.8	32.2	32.6	31.9	31.5	31.5	31.3	30.7	29.3	28.0	30.6
Tuticorin	27.6	28.2	29.6	31.9	34.3	35.5	34.4	34.5	33.9	31.9	29.1	27.8	31.6
Palamkottai	30.7	32.7	35.0	35.4	36.5	35.3	34.4	34.8	35.4	33.9	30.7	30.2	33.8
Hill Stations													
Ootacamund	19.9	20.6	21.9	22.1	21.8	18.0	16.4	17.3	18.2	18.7	18.9	19.7	19.5
Coonoor	18.8	20.8	22.7	23.5	24.2	22.3	21.2	21.5	21.4	20.7	19.3	18.8	21.3
Kodaikanal	17.0	17.9	19.2	19.8	20.4	18.5	17.1	17.5	17.7	17.0	16.1	16.4	17.9

TABLE 7

Normals of Daily Minimum Temperature (°C)

Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Madras	20.8	20.8	22.9	25.8	27.4	27.2	25.8	25.4	25.2	24.4	22.7	21.4	24.2
Vellore	18.2	19.2	21.4	25.0	26.6	26.3	25.5	25.0	24.4	23.0	20.7	18.7	22.8
Tirupattur	17.3	17.5	19.6	23.1	24.1	23.7	23.0	22.9	22.3	21.5	19.4	17.6	21.0
Cuddalore	20.8	21.2	22.9	25.7	27.1	27.0	26.1	25.4	25.1	24.3	22.8	21.5	24.2
Kallakurichi	20.5	20.4	22.4	25.4	26.6	26.5	25.1	24.8	24.6	23.8	22.4	21.0	23.6
Salem	19.2	20.2	22.5	25.1	25.5	24.4	23.6	23.4	23.3	22.8	21.2	19.6	22.6
Coimbatore	19.2	20.2	22.1	23.4	23.6	22.5	22.0	22.1	22.0	22.0	21.1	19.6	21.7
Nagapattinam	22.8	23.5	25.1	26.8	27.4	27.0	26.3	26.0	25.7	25.0	23.9	22.8	25.2
Tiruchirapalli	20.6	21.3	22.9	25.8	26.4	26.8	25.9	25.4	24.9	23.9	22.7	21.3	24.0
Madurai	20.9	21.6	23.4	25.4	26.3	26.3	25.7	25.2	24.8	24.0	23.0	21.6	24.0
Tandi	21.9	22.7	24.9	26.7	26.7	26.1	24.9	25.9	25.6	24.8	23.3	22.4	24.7
Pamban	24.0	24.1	25.1	26.7	27.5	27.1	26.5	26.4	26.3	25.6	24.7	24.0	25.7
Tuticorin	22.3	23.0	24.9	26.5	26.9	26.8	26.5	26.3	26.0	25.1	23.8	22.6	25.1
Palayamkottai	22.3	22.7	24.4	25.9	27.0	26.7	26.4	26.4	25.9	25.1	23.6	22.6	24.9

TABLE 7—*Contd.*

Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Hill Station:													
Ootacamund	5·1	6·3	8·4	10·2	11·2	11·1	10·9	10·9	10·4	10·0	8·3	6·3	9·1
Coonoor	8·5	9·6	11·3	13·8	15·0	15·2	15·1	14·6	13·8	13·4	11·7	9·4	12·6
Kodaikanal	8·0	8·7	10·0	11·6	12·7	12·2	11·5	11·5	11·3	10·9	9·8	8·6	10·6

TABLE 8

Normals of Mean Daily Temperature (°C)

Sub-division/ Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Madras	24·6	25·3	27·3	29·6	31·5	31·9	30·1	29·7	29·4	28·0	26·0	24·8	28·2
Vellore	23·6	25·4	28·0	30·9	32·5	31·2	29·9	29·6	29·0	27·4	25·0	23·4	28·0
Tirupattur	23·4	25·0	27·5	29·8	30·3	29·3	28·0	28·2	27·6	26·1	24·2	23·0	26·9
Cuddalore	24·4	25·1	26·9	29·3	31·4	32·0	30·8	30·0	29·5	27·9	25·0	24·7	28·
Kallakurichi	25·2	26·6	29·2	31·2	32·5	31·8	20·1	29·9	29·7	28·2	26·2	24·8	28·8
Salem	25·2	27·0	29·3	31·0	31·2	29·7	28·5	28·3	28·2	27·4	25·9	24·9	28·1
Coimbatore	24·5	2.2	28·4	29·0	28·6	26·5	25·5	26·0	26·4	26·2	25·2	24·3	26·4
Nagapattinam	25·3	26·1	27·7	29·7	31·5	31·8	30·8	30·2	29·7	28·2	26·4	25·3	28·6
Tiruchirapalli	25·4	27·0	29·0	31·3	31·8	31·5	30·7	30·3	29·6	28·1	26·3	25·3	28·9
Madurai	25·6	27·0	29·2	30·9	31·9	31·5	30·7	30·3	29·9	28·5	26·8	25·7	29·0
Tandi	25·6	26·3	27·8	29·4	30·0	29·7	29·5	29·3	29·2	27·9	26·5	26·0	28·1
Pamban	26·0	26·6	28·0	29·5	30·1	29·5	29·0	29·0	28·8	28·2	27·0	26·0	28·1
Tuticorin	25·0	25·6	27·3	29·2	30·6	31·2	30·5	30·4	30·0	28·5	26·5	25·2	28·4
Palayamkottai	26·5	27·7	29·7	30·7	31·8	31·0	30·4	30·6	30·7	29·5	27·2	26·4	29·4
Coonoor	13·7	15·2	17·0	18·7	19·6	18·8	18·2	18·1	17·6	17·1	15·5	14·1	17·0
Ootacamund	12·5	13·5	15·2	16·2	16·5	14·6	13·7	14·1	14·3	14·4	13·6	13·0	14·3
Kodaikanal	12·5	13·3	14·6	15·7	16·6	15·4	14·3	14·3	14·5	14·0	13·0	12·5	14·3

Climatic Classification

3.9 The State is mostly semi-arid. A narrow coastal strip is dry sub-humid. Tuticorin area is arid and Coimbatore also practically so.

Potential Evapotranspiration (PE)

3.10 The annual PE varies between 160 and 210 cm except in Tirupattur where it is of the order of 145 cm. Tuticorin and Tiruchirapalli areas have the highest PE values of well over 200 cm. Monthly PE values show large variation. In June, the range is from 13 to 24 cm, the high values being in Tiruchirapalli and Tuticorin areas. Because of the very low rainfall during June to September, Tuticorin PE is 20 to 22 cm per month in these months. The general range of values in the State is as follows :

July	13—25 cm
August	13—22 cm
September	12—20 cm

In the rainy months of October and November, the range is less, being 10-16 cm and 9-14 cm respectively. Table 9 gives the normal monthly and annual values of PE at various stations in the State.

TABLE 9

Normal Monthly and Annual Values of Potential Evapotranspiration (PE)

(mm)

Station	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Madras	130·2	130·9	170·4	188·9	211·6	202·5	190·3	184·8	173·8	153·3	135·6	129·5	2002·3
Vellore	111·6	125·4	168·5	177·6	184·0	163·1	152·8	147·7	136·0	118·7	100·4	99·8	1686·1
Tirupattur	98·2	110·5	147·1	147·6	146·2	135·9	126·2	131·9	120·1	99·3	90·6	86·9	1440·9
Cuddalore	112·6	116·4	151·4	159·2	176.6	164·1	150·3	145·4	139·4	120·6	102·5	106·2	1645·3
Salem	138·9	151·7	189·5	174·9	170·8	147·2	135·1	134·8	133·1	120·0	111·5	120·2	1728·3
Coimbatore	122·2	132·4	170·4	156·8	158·0	140·0	132·1	139·4	137·5	118·0	103·9	110·4	1622·2
Nagapattinam	133·6	136·2	167·4	164·1	177·1	171·6	162·6	156·9	148·8	127·2	112·2	118·0	1776·0
Tiruchirapalli	131·3	136·8	176·9	178·6	210·1	239·2	248·0	218·8	187·5	135·2	110·4	117·5	2091·0
Madurai	124·2	131·3	160·9	151·1	159·6	162·5	159·7	149·1	141·4	122·6	106·8	113·7	1683·6
Tandi	126·4	125·6	152·1	151·6	155·4	159·7	147·5	154·6	155·1	131·1	112·6	121·6	1693·7
Pamban	137·7	137·0	163·4	161·0	181·5	170·9	164·0	164·2	158·3	139·6	121·5	125·5	1825·2
Tuticorin	149·2	147·6	179·2	172·4	188·9	204·2	215·9	219·1	200·5	161·3	122·2	135·0	2097·1
Palayamkottai	130·6	136·1	170·6	155·0	175·0	175·5	186·1	194·3	177·4	144·1	107·9	121·2	1874·4
Kanyakumari	173·6	163·3	174·8	157·5	164·5	131·4	137·9	147·4	142·2	134·6	137·0	151·0	1816.0

4 RAINFALL ZONES, THEIR CROPPING AND LIVESTOCK PATTERNS

4.1 The State is divided into 20 rainfall zones and 2 special zones. These are indicated below together with the number of taluks included in each and their total approximate area :

Rainfall Zone	*Rainfall Pattern*	*Area sq km*	*Number taluks*
I	$E_4 (C_2 D_1 E_1) A_1 B_1 C_1 E_1$	4079	6
II	$D_1 E_3 (C_1 D_1 E_2) A_1 B_1 C_1 E_1$	1485	2
III	$E_4 (D_2 E_2) A_1 B_2 E_1$	1907	2
IV	$D_1 E_3 (C_2 D_1 E_1) B_1 C_1 E_2$	1940	2
V	$D_1 E_3 (C_2 D_1 E_1) B_1 C_2 E_1$	7305	8
VI	$D_1 E_3 (E_4) B_1 C_2 E_1$	5662	5
VII	$E_4 (C_2 D_2) B_2 C_1 E_1$	7397	7
VIII	$E_4 (E_4) C_2 D_1 E_1$	938	2
IX	$D_1 E_3 (C_2 D_2) C_1 D_1 E_2$	2525	3
X	$D_1 E_3 (E_4) C_2 E_2$	4690	3
XI	$D_1 E_3 (D_2 E_2) C_2 D_1 E_1$	3306	4
XII	$D_1 E_3 (C_1 D_1 E_2) C_2 D_1 E_1$	5828	6
XIII	$D_1 E_3 (C_2 D_1 E_1) C_2 D_1 E_1$	9230	5
XIV	$D_1 E_3 (C_2 D_2) C_2 D_1 E_1$	15691	15
XV	$D_2 E_2 (D_2 E_2) C_2 E_2$	7237	4
XVI	$D_2 E_2 (D_1 E_3) C_2 D_1 E_1$	11483	10
XVII	$D_2 E_2 (D_2E_2) C_2 D_1 E_1$	6759	6
XVIII	$D_2 E_2 (C_2 D_2) C_2 D_1 E_1$	4013	5
XIX	$C_1 E_3 (C_1 D_3) C_1 D_1 E_2$	3061	2
XX	$C_1 E_3 (C_2 D_2) C_1 D_1 E_2$	8239	9
Special I	$C_1 D_1 E_2 (A_3 B_1) C_1 D_1 E_2$		1
Special II	$C_1 D_1 E_2 (C_4) B_2 E_2$		1

Rainfall Zone I—$E_4 (C_2D^IE_1) A_1 B_1 C_1 E_1$

4.1 The districts and taluks included in the Zone and their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Pd_1	Ponneri	Chingleput
	Sidapet	„
	Madras	Madras
	Chidambaram	South Arcot
	Sirkali	Thanjavur
$Pd_3 Gn_4 B_4 R_5$	Cuddalore	South Arcot

4.2 The Zone has an area of 4079 sq km. Apart from Madras the highest population density of 1,168 per sq km in Saidapet and the lowest of 250 in Ponneri. The density in the remaining three taluks ranges from 476 to 573. This is a coastal zone with elevation of less than 100 masl and the soils are mostly coastal alluvium.

4.3 Forests are negligible but fallow lands constitute 13 to 25 per cent of geographical area in Ponneri, Saidapet and Chidambaram. The net sown area is 65 to 71 per cent in the southern taluks but only 25-37 per cent elsewhere.

4.4 The annual average rainfall of the Zone is 135 cm with heavier rainfall in the southern half. The number of rainy days is 55. November is the month of heaviest rainfall followed by October. The rainfall in October and November is 66 cm which is nearly 50 per cent of the annual. November is the only month with more than 30 cm rainfall and October gets 10-20 cm. All the months from August to December get more than 10 cm of rainfall; the total in these five months being between 80 and 90 per cent of the annual rainfall. Cuddalore and Chidambaram have 50 per cent irrigated area while Sirkali and Saidapet have more than 95 per cent.

4.5 Pd_1 is the main pattern of the Zone except in Cuddalore. Paddy dominates in Cuddalore taluk also though it covers only 30 per cent of the cropped area.

4.6 Rainy season in the Zone lasts for five months from August to December with more than 10 cm pm rainfall, but only one month receives more than 30 cm. This distribution of rainfall while suitable for crops like jowar is not adequate for rice. Yet rice is the dominant crop in this Zone, because of availability of adequate irrigation facilities.

4.7 Male cattle in the Zone dominate constituting 20 to 30 per cent of the total livestock of the respective taluks. In Ponneri, sheep and goats account for 15 per cent each. Sheep are smaller in number and are not significant in the southern part of the Zone. The livestock patterns in the Zone are :

Ponneri	$Cm_4 S_4 Cf_4 G_4$
Saidapet	$Cm_4 S_4 Cf_4 Bf_4 G_4$
Cuddalore, Chidamabaram, Sirkali	$Cm_4 Cf_4 G_4 Cy_4$
Madra	$Cm_4 Bf_4 Cf_4 S_4$

Rainfall Zone II—$D_1E_3 (C_1D_1E_2) A_1B_1C_1E_1$

4.8 The district and taluks in the Zone and their cropping pattern are :

Cropping Pattern	*Taluk*	*District*
Pd_1	Mayuram	Thanjavur
	Nannilam	„

4.9 The area of the Zone is 1485 sq km and the population density in Mayuram 568 per sq km and in Nannilam 403. Being coastal taluks, these are at the sea-level and the soil is deltaic alluvium. The Zone has good irrigation facilities covering 90-95 per cent of the area.

4.10 Forest area is negligible and fallow lands, also are not significant. Land not available for cultivation is 18 per cent and net sown area is 75 per cent of the reporting area.

4.11 The rainfall pattern is not materially different from Zone I. November is the month of maximum rainfall. Total rainfall in October and November months is 60 cm, which is 45 to 50 per cent of the annual precipitation. The annual rainfall is 127 cm in 55 rainy days. There are 4 to 5 months with more than 10 cm rainfall. August to December rainfall accounts for over 75 per cent of the annual precipitation.

4.12 Paddy is the main crop grown on more than 80 per cent of the gross cropped area of the Zone. Rainfall distribution with only one month of more than 30 cm pm would not be favourable for paddy. This deficiency is overcome by paddy being completely irrigated.

4.13 Goats form 27 per cent of total livestock in Nannilam. The livestock patterns are nearly same, viz G_4 Cm_4 Cf_4 Cy_4

Rainfall Zone III—E_4 (D_2E_2) $A_1B_2E_1$

4.14 The district, taluks and cropping pattern of the Zone are :

Cropping Pattern	*Taluk*	*District*
Pd_1	Nagapattinam	Thanjavur
	Thiruttaraipundi	"

4.15 The Zone has an area of 1,907 sq km, Thiruttaraipundi taluk having nearly double the area of Nagapattinam. Both the coastal taluks are at sea-level, and have a population density of 622 per sq km in Nagapattinam and 250 in Thiruttaraipundi. The soils are deltaic alluvium in Nagapattinam and laterite in Thiruttaraipundi with a narrow strip of coastal sand. Nagapattinam has over 90 per cent irrigated area followed by about Thiruttaraipundi with 60 per cent.

4.16 The area under forests is negligible. In Thiruttaraipundi the area not available for cultivation is 32 per cent of reporting area. The net sown area is only 50 per cent. In Nagapattinam net area sown is 72 per cent and land not available for cultivation is 18 per cent.

4.17 The annual rainfall in the Zone varies between 120 and 140 cm in 55 rainy days. November is the month of maximum rainfall and together with the rainfall of October—accounts for slightly less than 50 per cent of the annual precipitation. Only during months of October to December does rainfall exceed 10 cm pm. The rainfall of this period is about 70 per cent of the annual precipitation.

4.18 Paddy occupies more than 80 per cent of the gross cropped area and is entirely irrigated. Relative yield index of rice for the Thanjavur district for the autumn and summer crops is given below :

	Area '000 ha	*RYI**
Autumn	521	183
Summer	121	175
Total	642	175

*RYI represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71

The Relative Yield Index values are high (175-183) as compared to the RYI values of west coast which are 130-140, the crops in this region being mainly rainfed.

4.19 Goats dominate forming nearly 40 per cent of total livestock in Thiruttaraipundi. The pattern for the zone is : G_3 Cm_4 Cf_4 Cy_4.

Rainfall Zone IV—D_1E_3 ($C_2D_1E_1$) $B_1C_1E_2$

4.20 The districts and taluks in this zone with their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
Pd_3 Gn_3	Gingee	South Arcot
	Wandiwash	North Arcot

4.21 The total area of the Zone is 1,940 sq km and the population density is 275 per sq km. The elevation in the Zone ranges between 150 and 310 masl and the soils are red sandy. Wandiwash has 40 per cent and Gingee only 20 per cent area under irrigation.

4.22 Forests occupy about 10 per cent of the reporting area in Gingee and land not available for cultivation 20 per cent and cultivable waste 5 per cent while fallow lands occupy 10 per cent area in Wandiwash. The net sown area is about 50 per cent of the reporting area.

4.23. The annual rainfall is 110 cm in 55 rainy days. November is the month of maximum rainfall and together with October accounts for 40 per cent of the annual precipitation. Four to six months from July/August get more than 10 cm pm rainfall.

4.24 Paddy and groundnut each cover 40 per cent of the cropped area. The pattern is : Pd_3 Gn_3. Paddy crop is entirely irrigated. The Relative Yield Index values of rice and groundnut in the two districts are given below :

	*RYI**	
	rice	*groundnut*
South Arcot	170	126
North Arcot	151	126

*RYI represents district yield as percentage of tne corresponding all-India average yield for 1968-69 to 1970-71

Rice Yields are well above all-India average, though South Arcot has much higher yield.

4.25 Male cattle dominate and the livestock pattern is :

Cm_3 S_4 Cf_4

Rainfall Zone V—D_1E_3 ($C_2D_1E_1$) $B_1C_2E_1$

4.26 The districts and taluks included in this Zone and their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Pd_4 Mt_4 Gn_4 Jk_4/B_4	Vriudhachalam	South Arcot
	Ariyalur	Tiruchirapalli
	Udayarapalayam*	"
	Kumbakonam	Thanjavur
	Papanasam	"
Pd_1		"
	Mannargudi	"
	Pattukottai	"
Pd_2 Gn_4	Orathanadu	"

*Detailed data on cropping patterns not available.

4.27 This is a big zone extending to eight taluks and has a total area of 7,305 sq km. The areas of the taluks vary from 550 (Kumbakonam) to 1,500 sq km (Vriudhachalam). Being coastal, the elevations are not much above sea level. The soils are deltaic alluvium in the coastal belt and red sandy or laterite elsewhere. Taluks of Thanjavur district are nearly completely irrigated while in the remaining taluks of this Zone irrigation covers only 15 to 20 per cent of net sown area. Two of the taluks have a population density of 800 to 950 per sq km and the rest from 250 to 450. The total population of the Zone is more than 2.8 million corresponding to a density of over 4.50

4.28 Forests are practically negligible. Fallow lands occupy 5 to 10 per cent of the reporting area. The net sown area is 70 per cent.

4.29 Rainfall varies between 100 and 120 cm in 50 to 55 rainy days. November is the month of maximum rainfall and together with October accounts for 40 per cent of the annual precipitation. The months from August to December generally get more than 10 cm pm rainfall, being the rainiest period accounting for over 70 per cent of annual precipitation. There is only one month with more than 20 cm rainfall and this rainfall is mostly in November.

4.30 Paddy is the principal crop of all the districts and in Papanasam, Mannarguddi and Pattukotai taluks of Thanjavur more than 75 per cent of cropped area is under Paddy. In the other taluks paddy is only 20-30 per cent of the area and other crops like groundnut, small millets and jowar, Kharif) or bajra occupy 10-20 per cent area. Paddy crop is almost entirely irrigated; otherwise it cannot be grown because the rainfall of requisite amount is not received in the zone.

4.31 The Relative Yield Index values of rice and groundnut crops are given below :

		RYI*
	rice	*groundnut*
Thanjavur	175	122
South Arcot	170	126
Tiruchirapalli	162	116

*RYI represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

The rice yields are good being more than 160 per cent of all-India average because of good irrigation facilities available in Thanjavur district. Groundnut yield also is well above the all-India average.

4.32 Goats are highest in number in taluks of South Arcot and Tiruchirapalli districts followed by male cattle, female cattle, sheep and young stock of cattle. However, in the taluks of Thanjavur, male cattle dominate formnig about 30 per cent of the total followed by female cattle with an average of 17 and young stock of cattle 11 per cent. Goats are small in number. The main livestock patterns are :

South Arcot	G_4	Cm_4	Cf_4	S_4/Cy_4
Thanjavur	Cm_3	Cf_4	Cy_4	G_4

Rainfall Zone VI—D_1 E_3 (E_4) B_1 C_2 E_1

4.33 The districts and taluks included in this Zone and the cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Pd_3 Mt_4 B_4 L_4	Ramanathapuram	Ramanathapuram
Pd_3 S_4 Pu_5 Gn_5	Tiruchendur	Tirunelveli
Pd_3 Pu_4 Fr_4	Nanguneri	„
Pd_1	Tirunelvelli	„
	Ambasamudram	„

4.34 The area of the Zone is 5,662 sq km. The area of Nanguneri taluk is about 1,800 sq km and that of Ambasamudram 1,300 sq km. The area of each of the remaining taluks is about 850 sq km. In Nanguneri taluk, the maximum elevation is 500 masl but elsewhere it does not exceed 150 masl. The total population of the Zone is 1.7 million and Tirunelveli taluk has the highest population density of 497 per sq km in the Zone.

4.35 Forests occupy 46 per cent of the reporting area in Ambasamudram taluk, 12 per cent in Nanguneri and elsewhere it is small or negligible. Twenty per cent of the area is not available for cultivation in the Zone. Fallow lands are 15 to 30 per cent in the Zone and the net sown area 43 per cent in Ramanathanpuram and 15 to 30 per cent in the rest of the Zone. The soils are coastal alluvium in the coastal areas and red sandy elsewhere. Mixed red and black soils have also been observed. In Ambasamudram and Tirunelveli taluks 75 per cent of the area is irrigated while in Ramnathapuram it is only 22. In the remaining two taluks 45-55 per cent of the area is irrigated.

4.36 The annual rainfall varies between 75 and 100 cm. November is the month of maximum rainfall and the total rainfall in November and October or November and December whichever is higher, varies between 35 and 45 cm which comes to about 45 per cent of annual rainfall. October to December are the only months with more than 10 cm pm. The total rainfall in these three months exceeds 60 per cent of the annual precipitation.

4.37 Paddy is the principal crop of the Zone. In Ambasamundram and Tirunelveli taluks, paddy occupies about 70 per cent area and the other crops less than 10 per cent. In the other taluks, paddy occupies 37 to 46 per cent of the cropped area. Nanguneri and Tiruchendur have paddy and other pulses as common crops with fruits in the former and groundnut in the latter. Ramanthapuram taluk grows bajra and small millets besides paddy. Plantations occupy 10 per cent of the gross cropped area.

4.38 The Relative Yield Index values of rice, total pulses and groundnut are given below :

			RYI*
	rice	*total pulses*	*groundnut*
Tirunelvelli	186	47	122
Ramanathapuram	92	48	116

*RYI represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

In the taluks of Tirunelveli district paddy is entirely irrigated while in Ramanathapuram taluk only 50 per cent is irrigated. This might in part explain the lower yields in Ramanathapuram as rainfall distribution is not sufficient for growing paddy.

4.39 Sheep dominate in the zone. About 50 per cent of the total livestock in Tirunelveli and Nanguneri taluks consists of sheep. The patterns are :

Nanguneri	S_2 Cm_4 G_4
Tirunelvelli	S_3 Cm_4 G_4
Tiruchendur	S_4 G_4 Cm_4 Cf_4
Ramanathapuram	S_3 G_4 Cm_4 Cf_4
Ambasamudram	S_4 Cm_4 Cf_4 G_4 Cy_4

Rainfall Zone VII—E_4 (C_2 D_2) B_2 C_1 E_1

4.40 The districts and taluks included in the Zone alogwith their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Pd_2 Gn_4	Tiruvallur	Chingleput
Pd_1	Sriperumbudur	"
	Kanchipuram	"
	Chingleput	"
Pd_2 Gn_4	Maduranthakam	"
Pd_3 Gn_4 Mt_4	Tindivanam	South Arcot
Pd_3 Gn_4 $Mt_4/B_4/Jk_4$	Villupuram	"

4.41 The area of the Zone is 7,397 sq km. Four of the seven taluks have areas of over 1,000 sq km. Tindivanam is 1,468 sq. km. and Maduranthakam 1,374 sq km in area. The maximum elevation is only 235 masl in Chingleput taluk. In Kanchipuram the elevations range between 100 and 200 masl. Elsewhere in the zone, the elevation does not exceed 150 masl. The soils are coastal alluvium in the coastal belt and red sandy or loamy with some laterite in the interior. Tiruvallur and Chingleput are fully irrigated. In Tindivanam, the southermost taluk, however, only 16 per cent of the area is irrigated. Elsewhere irrigated area varies from 42 to 73 per cent. The population density varies from 420 to 465 per sq km. In Sriperumbudur, Kanchripuram and Vilupuram taluks and from 200 to 300 in the remaining taluks of the Zone.

4.42. Forest area is negligible and fallow lands occupy 28 per cent of reporting area in Tiruvallur and 10 per cent in the rest of the Zone. The net sown area is around 60 per cent in Tindivanam and Villupuram followed by about 50 per cent in Sriperumbudur and Kanchipuram and 30 to 35 per cent elsewhere.

4.43 This is a Zone of moderately good rainfall. The annual rainfall varies between 105 and 125 cm in 56 rainy days. November receives maximum rainfall and together with October accounts for 40 per cent of annual precipitation in 18 to 20 days. All the months from August to December get more than 10 cm pm rainfall.

4.44 Paddy is the principal crop followed by groundnut, small millets cover 9 per cent of gross cropped area in Tindivanam. Paddy occupies 75 to 80 per cent area in Chingelput, Sriperumbur and Kanchipuran followed by Maduranthakam and Tiruvallur with 60 to 65 per cent. Elsewere it accounts for 35 to 45 per cent.

4.45 The Relative Yield Index values for different crops of the Zone are given in Table 10,

TABLE 10

Relative Yield Index of Principal Crops in Zone VII

District	Area	Per cent of total cropped area	RYI*
rice			
Chingleput	313	73·1	137
South Arcot	307	43·9	170
groundnut			
Chingleput	57	13·4	130
South Arcot	155	22·1	128
ragi			
Chingleput	31	7·2	130
South Arcot	27	3·8	146

*RYI represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

The yields are much above the all-India level but yields in Chingleput are rather low considering that this area is highly irrigated.

4.46 Sheep and goats constitute 10 to 20 per cent of total livestock population, but male cattle (over 3 years) dominate forming 25 per cent of the total. The general livestock pattern for the Zone is :

Cm_4 S_4 Ct_4 G_4 Cy_4

Rainfall Zone VIII—E_4 (E_4) C_2 D_1 E_1

4.46 The district and taluks included in this Zone and their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
C_3 B_3 $Mt_4/F_4/Pd_4$	Tuticorin	Tirunelveli
Pd_3 C_4 B_4	Srivaikuntam	"

4.47 The area of the Zone is 938 sq km and the maximum elevation is 150 masl in Srivaikuntam. The soils are mainly coastal alluvium. Irrigated area in Srivaikantam is 44 per cent but in Tuticorin it is 15 per cent only. The total population of the Zone is 4 lakhs. Tuticorin has a high population density of 646 per sq km and Srivaikuntam 294.

4.48 Forest area is negligible. Twenty per cent area is not available for cultivation and another 10 per cent is cultivable waste. Fallow lands account for 12 per cent of area leaving the net sown area at 40 per cent.

4.49 This is a zone of low rainfall with 60 to 65 cm in 30 to 40 rainy days. October and November are the rainiest months and together account for 50 per cent of the annual precipitation.

4.50 In Tuticorin, cotton dominates with 37 per cent while in Srivaikuntam paddy occupies nearly half the cropped area.

Paddy grown in the Zone is entirely irrigated and the relative yield index is 186. Cotton area for the whole district is about 85,000 ha. Area under cotton in Coimbator district is higher by 10,000 ha and is the highest in any district. This crop is not irrigated and the

relative yield index is 80. Bajra occupies about 70,000 ha with a relative yield index of 142.

4.51 The yields of paddy and bajra are good but those of cotton well below all-India. Rice yields are of the same order as in Thanjavur district. Rainfall is inadequate for a crop like rice. Bajra crop is rainfed and its yields are good. The poorer yield of cotton may be attributed to the fact that the crop is un-irrigated. The yield, however, much higher than in Maharashtra where cotton is extensively grown as a rainfed crop.

4.52 Sheep dominate in the Zone followed by goats. In Srivaikuntham the distribution is sheep 35 per cent followed by goats 20 per cent, male cattle 13 per cent, famale cattle 9 per cent and cattle youngstock 8 per cent. The livestock pattern for Srivaikuntham zone is :

S_3 G_4 Cm_4 Cf_4

Rainfall Zone IX—D_1 E_3 (C_2 D_2) C_1 D_1 E_2

4.53 The districts and taluks included in the Zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
Pd_4 Gn_4 Mt_4 Jk_4 R_4 (S_4/Pu_4)	Vaniyambadi Tiruppattur	North Arcot "
Pu_4 Mt_4 Jk_4 Pd_5	Uthangarai	Dharmapuri

4.54 The area of the Zone is 2,525 sq km. The area of Tiruppattur is 1,150 sq km and that of Vaniyambadi 737 sq km and Uthangarai 638 sq km. This is an elevated zone, the elevations ranging between 300 and 1,150 masl. The red sandy soils prevail in the Zone. Vaniyambadi has a population density of 460 per sq km and the other two taluks of the Zone have density of 200-300.

4.55 Forests occupy 10-20 per cent and land not available for cultivation 10-15 per cent of reporting area. Fallow lands cover 10 per cent in Vaniyambadi and Uthangarai and 27 per cent in Tiruppattur. The net sown area is 66 per cent in Uthangarai followed by Vaniyambadi (55 per cent) and Tiruppattur (40 per cent).

4.56 The annual rainfall is 80 to 85 cm in 50 to 55 rainy days. September is the month of maximum rainfall. Rainfall in September and October totals to 30 cm in 16 rainy days. In general, the three consecutive months of August to October get more than 10 cm pm rainfall, the total being about fifty per cent of the annual precipitation. Only 10 per cent area is irrigated in Uthangarai and 30 to 35 per cent in the rest of the Zone.

4.57 Paddy is the leading foodgrain crop in the Vainyambadi and Tiruppattur taluks followed by kharif jowar and small millets. In the third taluk (Uthangarai) the leading foodgrain crops sown are small millets and pulses. Groundnut is the leading commercial crop growing in the area. In Vaniyambadi and Tiruppattur taluks five crops are needed to indicate a pattern.

4.58 The Relative Yield Index values of principal crops of the Zone are given in Table 11. Yields are generally well above all-India levels. Pulses are the lowest with only 40 per cent of all-India levels.

TABLE 11

Relative Yield Index of Principal Crops in Zone IX

Crop	North Arcot	Dharmapuri
rice	151	155
jowar (kharif)	148	150
ragi	138	108
small millets	193	129
sugarcane	171	—
groundnut	126	134
bajra	166	127
total pulses	42	43

NOTE: Relative Yield Index represents district expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71

4.59 Sheep are highest in number followed by male female cattle. These three together constitute more than 70 per cent of the livestock population. Sheep population is 30 per cent of the total. The pattern for the Zone is :

S_3 Cm_4 Cf_4

Rainfall Zone X—D_1 E_3 (E_4) C_2 E_2

4.60 The district and taluks included in the Zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
Jk_3 C_4 Pu_4 Gn_4	Coimbatore	Coimbatore
Pu_4 Jr_4 Pd_4 B_4/Mt_4	Dharmapuram	"
Jk_3 C_3	Palladam	"

4.61 The area of the Zone is 4,690 sq km. The areas of the three taluks of Coimbatore, Dharmapuram and Palladam individually are 1400, 1800, 1500 sq km respectively. The population density is 700 per sq km in Coimbatore and 200 to 300 in the rest of the zone. In Dharmapuram and Palladam the elevations range from 300 to 800 masl but in Coimbatore, the maximum elevation is 2000 masl.

The Zone has red sandy red loamy soil with patches of mixed red and black soils and deep black soils and 25 to 35 per cent land under irrigation.

4.62 Twenty six per cent of the reporting area of the Zone is under forests in Coimbatore. Land not available for cultivation account for 15 per cent and fallows 12 per cent. Fallow lands account for 35 per cent in Dharmapuram and about 17 per cent in Palladam. Net sown area is about 50 per cent in Coimbatore and Dharmapuram and 66 per cent in Palladam.

4.63 This is a Zone of lowest rainfall in the State with annual total of 60 cm in 35 to 45 rainy days. October is the month of maximum rainfall and together with November accounts for more than 45 per cent of the annual precipitation. There are only two months with more than 10 cm pm rainfall.

4.64 This is a zone where jowar (kharif), cotton and other pulses predominate. Jowar (kharif) area in Coimbatore and Palladam taluks is 39 and 45 per cent of gross cropped area, cotton area 13 and 24 per cent and other pulses 9 and 13 per cent respectively. In Coimbatore, 11 per cent area is occupied by groundnut also. In Dharmapuram area of other pulses is 21 per cent followed by jowar (rabi) and bajra with 17 per cent each, jowar (kharif) 11 per cent, paddy 9 per cent and cotton with 6 per cent.

4.65 The relative yield index values for different crops of Coimbatore district are given in Table 12.

TABLE 12

Relative Yield Index of Principal Crops in Zone X

Crop	RYI*
jowar (kharif)	119
jowar (rabi)	148
bajra	149
paddy	202
total pulses	41
groundnut	130
cotton	287

*RYI represents Coimbatore district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

The high yields of paddy and cotton are mainly due to irrigation. The cotton yields are comparable to those in Punjab. Pulses have the lowest yields.

4.66 On the whole sheep predominate in the Zone. Goats and Female cattle account for only 10 to 15 per cent. Female buffaloes constitute 10 per cent of livestock population in Coimbatore and Palladam. The livestock patterns, common with the neighbouring taluks, are :

Coimbatore	S_4 Cm_4 Cf_4 G_4 Cy_4
Palladam	S_3 Cm_4 Cf_4 G_4
Dharmapuram	S_3 Cf_4 G_4 Cy_4

Rainfall Zone XI—D_1 E_3 (D_2 E_2) C_2 D_1 E_1

4.67 The district and taluks and their cropping patterns in the Zone are :

Cropping Pattern	*Taluk*	*District*
C_4 Mt_4 B_4 Pd_4 F_4	Aruppukottai	Ramanathapuram
Pd_2 R_4/Gn_4	Paramakudi	,,
Pd_3 B_4 Mt_4 C_4/L_4	Mudukalathur	,,
Pd_1	Thiruvadanai	,,

4.68 The area of the Zone is 3,306 sq km. Areas of Paramakudi and Mudukalathur are each 600-700 sq km and that of the remaining taluks 1,000 sq km each. The population density is less than 300 per sq km., the lowest of 173 occurring in Thiruvadanai. The elevation ranges from sea-level to 100 masl. The soils are mostly coastal alluvium or red sandy.

4.69 There are no forests in the Zone. Fallow lands account for 10 to 20 per cent of the area. About 40 per cent area is cultivable waste and land not available for cultivation in Thiruvadanai. Net sown area is about 70 per cent in Aruppukottai and 50-60 per cent elsewhere.

4.70 The average annual rainfall in the Zone is 80 cm in 45 rainy days. The month of maximum rainfall is mostly November and together with October, accounts for more than 40 per cent of the annual rainfall. There are only two consecutive months October and November in this Zone which receive more than 10 cm pm rainfall. Fifty per cent area is irrigated in Paramkudi and Tiruvadanai and only 15 per cent in other taluks.

4.71 Paddy is the dominant crop occupying 80 per cent area in Thiruvadanai and 64 per cent in Paramakudi. Paddy area in Mudukalathur is only 33 per cent and 13 per cent in Aruppukottai. Small millets occupy 12 per cent area in Thiruvadanai, 17 per cent in Mudukalathur and 11 per cent in Aruppukottai and 9 per cent in Paramakudi taluks. Ragi area is 11 per cent in Paramakudi and only 5 per cent in Thiruvadanai. Cotton and bajra occupy 25 per cent and 17 per cent area in Aruppukottai but only 16 per cent and 9 per cent in Mudukalathur. While fodder crops occupy 14 per cent of area in Aruppukottai and Mudukalathur, Kharif Jowar occupies 9 per cent area.

4.72 The Relative Yield Index values of the crops of Ramanathapuram district are given in Table 13. Fifty per cent of area under paddy in Paramakudi and Mudukalathur is irrigated. Only 10-30 per cent of the paddy area in Aruppukottai is irrigated. The Relative Yield Index values of rice and cotton are low.

TABLE 13

Relative Yield Index of Principal crops in Zone XI

Crop	Area '000 ha	Percentage of total cropped area	RYI*
rice	263	40·7	92
Bajra	56	8·7	119
ragi	31	4·7	107
small millets	71	11·6	197
cotton	75	11·6	80

*RYI represents Ramanathapuram district yield expressed as percentage of the corresponding all-India average yield for 1968-69 and 1970-71.

4.73 There is dominance of sheep population which accounts for 34 to 58 per cent of total livestock population followed by male cattle with 13 to 23 per cent. Goat population in two taluks of Paramakudi and Thiruvadanai is 8-9 per cent but is higher at 23 and 16 per cent in Aruppukottai and Mudukalathur taluks. Female cattle generally account for 10 per

cent of the livestock population. The livestock patterns are :

Aruppukottai	$S_3\ Cm_4\ G_4\ Cf_4$
Paramakudi Mudukalathur Thiruvadanai	$S_2\ Cm_4\ G_4$

Rainfall Zone XII—D_1 E_3 (C_1 D_1 E_2) C_2 D_1 E_1

4.74 The district and taluks alongwith their cropping patterns in the Zone are given below :

Cropping Pattern	*Taluk*	*District*
$Pd_3\ Jk_4\ B_4$	Lalgudi	Tiruchirapalli
$Pd_4\ Jk_4\ B_4\ Gn_4$	Musiri	,,
$Pd_3\ Jk_4\ Jr_4\ B_4\ Gn_4$	Thuraiyar	,,
$Pd_4\ B_4\ Jr_4\ Gn_4\ Mt_4$	Kulithalai	,,
$Pd_3\ Gn_3$	Tiruchirapalli	,,
$Jk_4\ Pd_4\ Mt_4\ Gn_5$	Manapparai	,,

4.75 The Zone has six taluks with a total area of 5,828 sq km. Four of these taluks are about 1,000 sq km and other two 700-800 sq km in area. The population density of 948 per sq km is highest in Tiruchirapalli but elsewhere it ranges from 200 to 300. In Thuraiyar, the elevation ranges from 150 to 1,000 masl, and in Manapparai and Kulithalai from 300 to 500 masl. The soils are mainly red sandy.

4.76 Forest area is negligible except in Musiri and Manapparai. Area not available for cultivation varies between 15 and 30 per cent of the geographical area and together with cultivable waste it totals to between 20 and 40 per cent. Fallow lands in some of the taluks occupy 15 to 20 per cent leaving the net sown area at between 45 and 55 per cent of the reporting area.

4.77 The annual average rainfall is 80 cm in 35 rainy days. October is the month of maximum rainfall and together with November accounts for 40 per cent of the annual precipitation. During the months September to November there is 10 cm pm of rainfall. There is no month with rainfall higher than 20 cm. In Tiruchirpalli 80 per cent of the area is irrigated and in the rest of the Zone irrigated area is only 30 to 40 per cent of the total area.

4.78 Paddy is the main crop and appears in all the four cropping patterns of the Zone. In Tiruchirapalli, paddy occupies nearly 50 per cent and groundnut 38 per cent of the cropped area. In Lalgudi paddy accounts for 42 per cent area. Besides paddy, crops like jowar (Kharif and rabi), bajra groundnut and small millets occupy smaller areas of the order of 10 to 20 per cent only.

4.79 The Relative Yield Index values of the crops of the Zone are given in Table 14. The area under paddy is nearly 30 per cent with a Relative Yield Index of 162. The Relative Yield Index of small millets at 264 is very good. Cotton yield is three times of the all-India average and is of the same order as yields in Punjab. This is a zone of low to moderate rainfall with hardly a month having even 20 cm. Irrigation facility has enabled paddy crop to be grown on nearly a third of the total cropped area. The Relative Yield Index is as high as 162 though about 13 points lower than in Thanjavur. Cotton is grown only on a small area, a good portion of which is irrigated. The yield is very good.

TABLE 14

Relative Yield Index of Principal Crops in Zone XII

Crop	Area '000 ha	percent of gross croped area	RYI*
rice	231	28·8	162
jowar (kharif)	98	12·2	113
jowar (rabi)	31	3·9	140
bajra	108	13·4	143
groundnut	101	12·6	116
small millets	84	10·4	264
cotton	9	1·2	297

*RYI represents Tiruchirapalli district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.80 Sheep dominate in the zone with 34 per cent in Kulithalai and Thuraiyar, 27 per cent in Musiri, 19 per cent in Lalgudi and 15 per cent in Tiruchirapalli followed by goats ranging from 12 per cent to 27 per cent and male cattle from 16 per cent in Kulithalai to 22 per cent in Musiri. Female cattle account for about 15 per cent of livestock population. The population of cattle youngstock ranges from 10 to 16 per cent. The livestock patterns are :

Lalgudi	$G_4\ S_4\ Cm_4\ Cf_4$
Tiruchirapalli	$Cm_4\ Cf_4\ Cy_4\ S_4\ G_4$
Musiri Thuraiyar Kulithalai Manapparai	$S_3\ G_4\ Cm_4\ Cf_4$

Rainfall Zone XIII—D_1 E_3 (C_2 D_1 E_1) C_2 D_1 E_1

4.81 The districts and taluks included in the Zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
$Pd_3\ Gn_4\ D_4$	Tirukoilur	South Arcot
$Pd_3\ Gn_4\ Jk_4$	Kallakurichi	,,
$Jk_3\ Pd_4\ Mt_4$	Parambalur	Tiruchirapalli
$Pu_4\ Mt_4 Jk_4 Pd_4$	Harur	Dharmapuri
$Pd_3\ Mt_4\ Jk_5\ Jr_5$	Attur	Salem

4.82 Although the Zone contains only five taluks, its area is large (9,230 sq km). Areas of Kallakurichi and Harur taluks exceed 2,000 sq km. In Kallakurichi the maximum elevation is 1300 masl while in Parambalur and Harur it is only 600 masl. The soils in the Zone are mainly red sandy and about 20 per cent of the area is irrigated.

4.83 Harur has more than one-third of its area under forests and about 10 per cent each is not available for cultivation and fallow lands. Forest area is 10 per cent in the rest of the Zone except in Attur where it is 21 per cent; land not available for cultivation is

more than 15 per cent and as high as 37 per cent in Kallakurichi. Fallow lands are about 10 per cent. The net sown area is 55 per cent in Peramballur and Tirukoilur and 35 to 40 per cent elsewhere.

4.84 Harur has the lowest annual rainfall of 79 cm in 52 rainy days. The average of the rest of the Zone is 100 cm in 55 rainy days. October is the month of maximum rainfall and the total of October and November (or September, whichever is higher) is 35 cm or 35 per cent of the annual precipitation. The months from August to November receive more than 10 cm pm rainfall and the total of these months comes to 60-65 per cent of the annual precipitation.

4.85 Paddy occupies the largest area in the Zone and the crop is mostly irrigated. The next important crop in Tirukoilur and Kallakurichi taluks is groundnut, accounting for 24 per cent of the gross cropped area. The other crops which are sown to a significant extent in the Zone are millets, kharif jowar and bajra as also pulses in Harur taluk.

4.86 The Relative Yield Index values of crops are given in Table 15. Five taluks of this Zone are located in four districts. The district yields given below are mainly intended to give a general idea. The yields of the different crops mentioned above are good except for pulses which are only 43 per cent of the all-India levels.

TABLE 15

Relative Yield Index of Principal Crops in Zone XIII

District	Rice	Bajra	Jowar (kharif)	Small millets	Groundnut	Total pulses
South Arcot	170	167	144	383	126	43
Tiruchirapalli	162	143	113	264	116	43
Salem	175	130	132	146	133	43
Dharamapuri	155	127	150	129	134	43

NOTE: Relative Yield Index represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.87. In Tirukoilur taluk cattle male and female each account for a quarter of the livestock population and the youngstock of cattle for another 12 per cent. In other taluks the population of sheep is quite high ranging from 28 to 36 per cent of total livestock population. The livestock patterns which occur in the Zone are :

Tirukoilur taluk	Cm_4 Cf_4 S_4 G_4 (Cy_4)
Rest of the Zone	S_3 Cm_4 G_4 Cf_4

Rainfall Zone XIV—D_1 E_3 (C_2 D_2) C_2 D_1 E_1

4.88 The districts and taluks included in the zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
Pd_2	Thanjavur	Thanjavur
Pd_1 Gn_4	Arantangi	,,
Pd_3 Mt_4 Gn_4	Kulathur	Tiruchirapalli
	Alangudi	,,
Pd_2 Gn_4	Thirumayam	,,
	Arkonam	North Arcot
	Polur	,,
Pd_3 Gn_4	Walajahpet	,,
Pd_3 Gn_3	Cheyyar	,,
	Chengam	,,
	Thiruvannamalai	,,
	Tiruttani	Chingleput
Pd_2 Gn_3	Arni	North Arcot
Gn_3 Pd_4 S_4	Gudiyatham	,,
Gn_4 Pd_4	Vellore	,,

4.89 This is the largest Zone in the State with 15 taluks in 4 districts. The area of the Zone is 15,691 sq km. The areas of taluks vary widely from 450 sq km to 2,400 sq km. The largest taluk is Kulathur in Truchirapalli district with an area of 2,388 sq km. The population density varies widely in the Zone from 90 per sq km in Kulathur to 468 in Thanjavur. Six of the taluks have a density exceeding 300. In a number of taluks maximum elevation is well above 800 masl and in Arantangi Chengam Tirumayam Gudiyatham, Vellore and Thiruvannamalai it is 1,000 to 1,100 masl. The soils are coastal alluviam, red sandy or laterite.

4.90 Forests cover 35 to 60 per cent area in Gudiyatham, Vellore, Polur and Chengam taluks of North Arcot district and in a number of taluks in this district, another 15 to 30 per cent of land is not available for cultivation. Fallow lands account for more than 10 per cent in a number of taluks. The net sown area is as low as 30 per cent in three taluks and above 50 per cent in Thanjavur and four other taluks.

4.91 In the two taluks of Thanjavur district 65-70 per cent of reporting area is irrigated and in Arkonam taluk it is 89 per cent, the highest in the Zone. Elsewhere, irrigated area varies between 30 and 50 per cent except in Chengam where it is only 14 per cent.

4.92 Annual rainfall is 100 cm in 55 rainy days. In half the area of the Zone, the highest monthly rainfall is received in November and in the other half in October. In two consecutive months of highest rainfall about 35 cm accounting for 35 per cent of the total annual rainfall is received. Generally, there are four

consecutive months from August to November getting more than 10 cm pm rainfall in North Arcot district accounting for more than 60 per cent of the annual precipitation.

4.93 Paddy is the dominant crop in the whole Zone as in most of the State. In the various patterns paddy exceeds 30 per cent excepting Gudiyatham and Vellore, where it is less than 30 per cent. The other common crop is groundnut. In Cheyyar, Gudiyatham, Arni, Chengam and Tiruvannamalai the percentage area covered by groundnut exceeds 30. Sugarcane occupies 10 per cent area in Gudiyatham taluk.

4.94 The Relative Yield Index values of crops are given in Table 16. Although highly irrigated, paddy yields show considerable variation the RYI being 137 in Chengleput and 175 in Thanjavur, the highest in this Zone.

TABLE 16

Relative Yield Index of Principal Crops in Zone XIV

District	Rice	Groundnut
Thanjavur	174	122
Tiruchirapalli	162	116
North Arcot	151	126
Chingleput	137	130

NOTE : Relative Yield Index represents district yeild expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.95 Male cattle dominate in this Zone though in some of the taluks sheep population is equal or even higher than that of male cattle. In Kalathur and Arantangi, sheep constitute 42 per cent of the total livestock. Male cattle population ranges mostly between 25 and 33 per cent. Goat population in many of the taluks is only 5 to 7 per cent of the total. Only in Thanjavur and Allangudi goats constitute 17 per cent of livestock population. Buffaloes hardly figure in any taluk in a significant manner. Female cattle are about 15 per cent of the total and youngstock of cattle varies between 8 and 10 per cent. The patterns in the taluks are shown below :

Pattern	*Taluk*	*District*
S_3 Cm_4 Cf_4	Arantangi	Thanjavur
	Walajahpet	North Arcot
	Changam	,,
	Tiruvannamalai	,,
	Tiruttani	Chingleput
	Thirumayam	Tiruchirapalli
	Kulathur	,,
Cm_3 S_4 Cf_4	Arni	North Arcot
	Polur	,,
	Choyyar	,,
Cm_4 S_4 Cf_4 Cy_4 (G_4)	Vellore	,,
	Gudiyatham	,
Cm_4 Cf_4 S_4 G_4	Thanjavur	Thanjavur
	Alangudi	Tiruchirapalli
Cm_4 G_4 Cf_4 Cy_4	Arkonam	North Arcot

Rainfall Zone XV—D_2 E_2 (D_2 E_2) C_2 E_2

4.96 The district and taluks included in this Zone and their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Pd_4 B_4 Gn_4 Jk_4 R_4	Gopichetti-palayam	Coimbatore
	Bhavani	,,
Pd_4 Gn_4 Jk_4	Erode	,,
Jk_3 C_4 Pu_5 Gn_4	Avanashi	,,

4.97 The Zone comprises 4 taluks in Coimbatore district and covers an area of 7,237 sq km. Area of Gopichettipalayam taluk is the highest being 2,823 sq km and that of others varies from 1300 to 1500 sq km. The elevation of Erode taluk is from 170 to 180 masl. Other taluks vary in elevation from 300 to 1,900 masl. The soils are mostly red sandy. The total population of the Zone is 1.8 million. Erode taluk has population density of 400 per sq km and the rest of between 165 and 270, the lowest being 165 in Gopichettipalayam.

4.98 Bhavani and Gopichettipalayam taluks have more than 50 per cent area under forests and Erode and Avanashi have 10 per cent area not avilable for cultivation. In Erode taluk 23 per cent of the geographical area is under fallow lands. The net sown area is 60 per cent in Erode, 54 per cent in Avanashi and 30 per cent in the remaining taluks.

4.99 The annual rainfall is 70 to 80 cm in 45 to 50 rainy days. October is the month of maximum rainfall and together with November receives 30 cm of rain. There are generally only two months (October and November) with more than 10 cm rainfall. Avanashi taluk has 15 per cent area under irrigation while in other taluks irrigated area ranges from 40 to 50 per cent of the cropped area.

4.100 In Avanashi, jowar (Kharif) is the dominant crop and is grown on 40 per cent area. The pattern for this taluk is : Jk_3 Gn_4 C_4 Pu_4. The remaining three taluks (except Erode) of the Zone have nearly the same distribution of crops. Ragi covers only 6 per cent area. The main crops are paddy, groundnut, bajra and jowar (kharif). In Bhavani, sugarcane is grown on only 8 per cent of the area.

4.101 The Relative Yield Index values of the crops are given in Table 17. All the crops, excepting total pulses, have yields well above all-India average. Rice yield is twice the all-India average. The yield of cotton is as high as in Punjab, due probably to irrigation facilities.

TABLE 17

Relative Yield Index of Principal Crops in Zone XV

District	Crop	Area '000 ha	Percent of gross cropped area	RYI*
Coimbatore	rice	96	11·8	202
	jowar (kharif)	159	19·6	119
	bajra	59	7·2	149
	groundnut	117	14·5	130
	cotton	95	11·7	287
	ragi	30	3·9	149
	sugarcane	30	3·7	185
	pulses	86	10·6	41

*RYI represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.102 Sheep population is dominant in the Zone with nearly 30 per cent followed by male cattle with 18, female cattle 15 and goats 10 to 16 per cent of livestock population. Though in Erode sheep are 31 per cent, a common pattern for the Zone is :

S_4 Cm_4 G_4 Cf_4

Rainfall Zone XVI—D_2 E_2 (D_1 E_3) C_2 D_1 E_1

4.103 The districts and taluks in the zone and their cropping patterns are given below :

Cropping Pattern	*Taluk*	*District*
Jk_3 Gn_4 Pd_4	Uthamapalayam	Madurai
FR_3 L_4 Pt_4	Kodaikanal	,,
Jr_3 Pu_4 Mt_4	Palani	,,
C_4 Jk_4 Pd_4 Pu_4 Mt_4	Udumalpet	Coimbatore
$B_3O_4Jk_4$	Karur	Tiruchirapalli
B_3 C_3 Mt_4 F_4	Kovilpatti	Tirunelveli
C_4 B_4	Vilathikulam	,,
	Sattur	Ramanatha-puram
Pd_4 B_4 C_4 Mt_4	Srivilliputhur	
C_4 Mt_4 B_4	Sankaranaya-narkoil	Tiruneluli

4.104 The area of the Zone is 11,403 sq km. Srivilliputhur taluk has the smallest area of 500 sq km, the rest varying between 900 and 1600 sq km. Areas of Palani and Karur are 1,563 and 1,577 sq km respectively. The population density in the different taluks varies widely, the lowest being 72 in Kodaikanal and the highest 397, in Srivilliputhur. Kovilpatti and Vilathikulam are practically at sea-level. The western taluks are elevated, the lowest and highest elevations in each taluk being 150-300 and 1500-2500 masl. The soils are red sandy and mixed red and black. In the coastal taluks, coastal alluvuim is also present.

4.105 Kodaikanal taluk has 63 per cent areas under forests, the highest in the Zone followed by Uthamapalayam and Udumalpet with 35 and 40 per cent respectively. There are practically no forests in the rest of the Zone. Fifteen per cent area on an average is not available for cultivation. Fallow lands cover between 10 and 20 per cent excepting Vilathikulam with 26 per cent and Sankaranaynarkoil with 35 per cent. The net sown area is only 17 per cent in Kodaikanal and 42 per cent in Udumalpet. In the rest of the Zone, it varies between 48 and 66 per cent.

4.106 Thirty to 45 per cent area is irrigated in Uthamapalayam, Palani, Udumalpet, Srivilliputhur and Sankarayanaynarkoil but Kodaikanal and Vilathikulam taluks have less than 10 per cent and the remaining taluks 15 to 20 per cent.

4.107 Average annual rainfall in Kodaikanal is 167 cm in 106 rainy days. In the rest of the Zone, excepting mountainous areas of the west, rainfall varies between 65 cm in Karur and 86 cm in Srivilliputhur. October is the month of maximum rainfall but in a number of taluks the difference in rainfall in October and November is of 1 cm only. The total rainfall during October and November is 45 per cent of the total. These are the only two consecutive months which get more than 10 cm of rainfall each.

4.108 Cotton and bajra are the dominant crops of this Zone. In Karur and Vilathikulam as much as 48 *and* 38 *per cent respectively of the cropped area is* under bajra and in Kovilpatti more than 20 per cent of the area is under cotton. Palani is the only taluk in the State where rabi jowar is the leading crop accounting for 32 per cent of the cropped area and has, therefore, been treated as a special Zone. In Kodaikanal taluk fruits are grown over 42 per cent of the cropped area and potatoes over 18 per cent area because of orographic considerations. The Zone lies outside the leading paddy areas in the east and this crop covers between 6 to 16 per cent of the cropped area in certain taluks (namely Sankaranaynarkoil, Udumalpet, Karur, Uthamapalayam and Talani) more significant extent (24 per cent of the cropped more significant extent (24 per cent of the cropped area).

4.109 The Relative Yield Index values of crops are given in Table 18. Yield of jowar (rabi) is significantly better than that of jowar (kharif). Groundnut yield is nearly uniform in all districts but that of cotton is subject to marked variations being higher in Tirunelveli and Ramanthapuram districts. This may be due to larger irrigation facilities in those districts.

TABLE 18

Relative Yield Index of Principal crops in Zone XVI*

	Madurai	Tirunel-veli	Coimbatore	Rama-natha-puram
rice	170	186	202	92
jowar (kharif)	165	186	119	126
jowar (rabi)	204	231	148	157
bajra	162	142	149	119
small millets	171	137	139	197
total pulses	42	48	41	47
groundnut	124	122	130	116
cotton	154	80	286	74

NOTE : Relative Yield Index represents district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.110 Except in Kodaikanal taluk, sheep account for 34 to 49 per cent of the total livestock population. Male cattle account for between 13 to 26 per cent in the Zone except in Karur taluk. A characteristic feature of the livestock pattern is that the number of sheep in the Kodaikanal taluk and male cattle in Karur taluk is almost negligible. The livestock patterns which occur in the Zone are as below :

Sankaranaynarkoil, Sattur, Kovilpatti, Vilathikulam	$S_3 G_4 Cm_4$
Karur	$S_3 G_4 Cf_4$
Srivilliputhur, Palani	$S_3 Cm_4 G_4 Cf_4$
Udumalpet	$S_4 Cm_4 Cf_4 G_4$
Uthamapalayam, Kodaikanal	$Cf_4 Cm_4 G_4 Cy_4$

Rainfall Zone XVII—$D_2 E_2 (D_2 E_2) C_2 D_1 E_1$

4.111 The district and taluks included in this Zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
$B_4 Jk_4 Mt_4 Gn_4$	Vedasandur	Madurai
$Jk_4 Gn_4 Mt_4 Pd_4 Jr_4$	Dindigul	,,
$Pd_4 Gn_4 Jk_4 Pu_4/Jr_4$	Nilakottai	,,
$Pd_4 Jk_4 Gn_4$	Usilampatti	,,
$C_4 Mt_4 Pd_4 Gn_4/F_4$	Tirumangalam	,,
$Jk_4 Mt_4 Pd_4 C_4$	Pariyakulam	,,

4.112 The Zone comprises 6 taluks in Madurai district and covers an area of 6,759 sq km. The area of Tirumangalam taluk is 780 sq km but that of the rest of the taluks exceeds 1000 sq km. Area of Pariyakulam taluk is 1,500 sq km. The total population of the zone is 2 million. Population density in Dindigul is 391 per sq km and that of the other taluks between 200 and 300. Elevation in Tirumangalam taluk is 100 masl and in other taluks of the Zone elevation ranges from 300 to 1800 masl. The soils are red sandy or mixed red and black.

4.113 Forests in Pariyakulam taluk cover 35 per cent of the geographical area, but in other taluks only 10 to 20 per cent. Another 10 to 20 per cent land is not available for cultivation and fallow lands occupy between 10 and 25 per cent of the reporting area in the different taluks. The net area sown is thus reduced to 68 per cent in Tirumangalam and 56 per cent in Dindigul. Elsewhere, the net sown area is 35 to 45 per ent only.

4.114 The average annual rainfall generally varies between 80 and 90 cm in 50 rainy days. Vedasandur has slightly less rainfall i.e. 74 cm in rainy days. October is the month of maximum rainfall with an average of 19 cm, which is about 22 per cent of the annual precipitation. Together with November which gets an average of 15 cm, the total precipitation represents more than 35 per cent of the annual rainfall. October and November with their average rainfall of 19 and 15 cm respectively are the only two consecutive months with more than 10 cm pm of rainfall, But during August and September, a number of taluks have 10 cm pm rainfall. April and May receive more than 5 cm pm, their averages being 6 and 8 cm respectively. Irrigated area in Usilampatti taluk is 58 per cent and in Nilakottai 44 per cent. In the rest of the Zone, the irrigated area is 15 to 25 per cent of the cropped area.

4.115 No single crop exceeds 30 per cent of the cropped area in the Zone. Paddy in Nilakottai taluk occupies 28 per cent and jowar (kharif) 27 per cent in Periyakulam. Paddy is grown on 10 per cent area but is not a dominant crop in most of the taluks.

4.116 The Relative Yield Index values of the crops are given in Table 19. This is a zone with a number of crops covering areas between 10 and 20 per cent each. The yields are comparable generally with other districts. Paddy is almost entirely irrigated.

TABLE 19

Relative Yield Index of Principal Crops in Zone XVII

Crop	Area ('000 ha)	Per each of total cropped area	RYI*
rice	157	24·7	170
jowar (kharif)	97	15·3	165
jowar (rabi)	28	4·4	204
bajra	20	3·2	162
small millets	69	10·8	171
total pulses	29	4·6	42
groundnut	103	16·2	124
cotton	33	5·2	154
banana	12	2·0	65

RYI* represents Madurai district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

4.117 Sheep dominate in the Zone although in Periyakulam taluk they are 9 per cent less than male cattle which account for 25 per cent of livestock population. Sheep do not exceed 40 per cent of the total in any taluk and other animals do not comprise even 30 per cent. Goats and female cattle are of the order of 15 per cent. The livestock patterns of Zone are as follows :

Nilakottai, Periyakulam	$Cm_4 S_4 Cf_4 G_4$
Dindigul, Tirumangalam	$S_3 Cf_4 Cm_4 G_4$

Rainfall Zone XVIII—$D_2 E_2 (C_2 D_2) C_2 D_1 E_1$

4.118 The districts and taluks included in the Zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
$Pd_3 Jk_4$	Madurai(South)	Madurai
Pd_1	Madurai (North)	,,
$Pd_3 Gn_4$	Melur	,,
	Sivaganga	Ramanathapuram
$Pd_2 Pu_4 Gn_4$	Tiruppathur	,,

4.119 The area of the Zone is 4,013 sq km. Madurai (North) and Madurai (South) together cover only 700 sq km in area. The areas of the remaining taluks vary between 950 and 1,250 sq km. Population density in Madurai (South) is 2,519, in Madurai (North) it is 423 and in the rest of the taluks between 160 and 230. Elevations of Madurai taluks range from 100 to 150 masl. Elevation in Sivaganga is below 100 masl and that in Melur from 150 to 950 masl. The soils are red sandy.

4.120 Forest area is small, being 18 per cent. In Melur 20 to 40 per cent land is not available for cultivation and fallow lands cover 10 to 25 per cent of area. Net sown area is 60 per cent in Madurai (North), 30 per cent in Sivaganga and 40 to 45 per cent in the rest of the Zone. 70 per cent of net sown area is irrigated in Sivaganga, 60 per cent in Madurai (South) and 45-55 per cent elsewhere.

4.121 The annual rainfall is 90 to 100 cm in 54 rainy days. In October, the month of maximum rainfall, it is 17-18 cm which corresponds to 17 per cent of the annual precipitation. Together with November, which has an average of 15 cm, the total is 33 cm, accounting for more than 35 per cent of the annual precipitation. In this Zone, all the months from August to November get more than 10 cm rainfall and the total represents 65 to 70 per cent of the annual precipitation. Rainfall in December averages 5 to 7 cm and in April and May 6-7 cm pm.

4.122 This is a paddy Zone with about 50 per cent area under this crop. Groundnut area varies between 9 and 22 per cent. The cropping pattern is :

$Pd_2\ Gn_4$

4.123 The Relative Yield Index values of districts in which the taluks are located are given below :

District	*Rice*	*Groundnut*
Madurai	170	124
Ramanathapuram	92	116

Though paddy is almost entirely irrigated, yields in Ramanathapuram are low.

4.124 Sheep and male cattle dominate in the Zone. In Madurai, male cattle are large in number than sheep. Sheep population is higher than that of other livestock taluks. The livestock patterns are :

Madurai	$Cm_4\ Cf_4\ S_4\ Cy_4$
Melur Tiruppathur	$S_4\ Cm_4\ Cf_4\ G_4$
Sivaganga	$S_3\ Cm_4\ Cf_4\ G_4$

Rainfall Zone XIX—$C_1\ E_3\ (C_1\ D_3)\ C_1\ D_1\ E_2$

4.125 Only two taluks of Hosur and Denkanikota of Dharmapuri district constitute the Zone which has a total area of 3,061 sq km. Its cropping pattern is:

$R_3\ Pu_4$

4.126 This is an elevated plateau Zone. Hosur is at an elevation of 900 masl and Denkanikota has elevations varying from 240 to 1,400 masl. The soils are red sandy and 9 per cent of the cropped area is irrigated. The total population of the Zone is under 4 lakhs and the population density is low being only 120-130 per sq km.

4.127 Forests occupy 35 to 40 per cent of the geographical area and 25 per cent of land is not available for cultivation. The net sown area is, therefore, 35 per cent of the reporting area.

4.128 This is a zone of low rainfall, the amounts varying between 80 and 85 cm annually in 55 rainy days. October is the month of maximum rainfall and together with September, which is the next most rainy month, accounts for 35 per cent of the total rainfall. The Zone has only two consecutive months of more than 10 cm pm but in August rainfall is 10 cm. At least one month in each of the three seasons has more than 10 cm rainfall.

4.129 Ragi is the dominant crop of this Zone, occupying 40 to 50 per cent of the cropped area followed by other pulses with 15 to 25 per cent and oil seeds (other than groundnut) with about 10 per cent. Ragi, other pulses and other oilseeds together cover 75 per cent of the cropped area.

4.130 The Relative Yield Index values of the important crops of the Zone are given below :

	Area ('000 *ha*)	*Per cent of gross cropped area*	*RYI**
ragi	92	20·4	108
total	86	19·1	43

*RYI represents Dharmapuri district yield expressed as percentage of the corresponding all-India average yield for 1968-69 to 1970-71.

The average yield of pulses in the State is low the RYI being only 42.

4.131 In Hosur, female cattle constitute 32 per cent of the livestock followed by sheep (26 per cent), young stock of cattle (17 per cent) and male cattle and goats (10 per cent each). The livestock pattern is :

$Cf_3\ S_4\ Cy_4$

Rainfall Zone XX—$C_1\ E_3\ (C_2\ D_2)\ C_1\ D_1\ E_2$

4.132 The districts and taluks in the zone and their cropping patterns are :

Cropping Pattern	*Taluk*	*District*
$Pd_4\ Gn_4\ Mt_4\ Jk_4\ Pu_4$	Krishnagiri	Dharmapuri
$Pu_4\ Mt_4\ Jk_4\ R_4$	Dharmapuri	,,
$R_4\ Jk_4\ Pu_4\ Gn_4$	Mettur	Salem
	Omalur	,,
$Gn_4\ Pd_4\ Mt_4\ Jr_4\ Jk_4$	Salem	,,
$Gn_4\ Pd_4\ Mt_4\ Jr_4$	Rasipuram	,,
$Gn_3\ Jk_4\ R_4\ Pd_4$	Sankari	,,
$Gn_3\ Jk_4\ B_4\ Pd_4$	Tiruchengode	,,
$B_4\ Gn_4\ Jr_4\ Pd_4$	Namakkal	,,

4.133 The total area of the Zone is 8,239 sq km. Namakkal taluk has the largest area of 1,741 sq km and Krishnagiri and Dharmapuri from 1,111 to 1,470 sq km respectively. The remaining taluks are between 500 and 800 sq km in area. Salem has the

highest population density of 1,232. Density in other taluks varies from 275 to 500. Many of the taluks start with elevations of about 300 masl. The maximum elevation is 1,200 to 1,500 masl in Salem, Rasipuram, Mettur and Dharmapuri, and in the remaining taluks from 700 to 900 masl. The soils in the Zone are red sandy.

4.134 Forests occupy 30 per cent of the area in Krishnagiri, 20 per cent in Namakkal and are negligible in the rest of the Zone. Ten to 25 per cent land is not available for cultivation and another 10 to 20 per cent is fallow. This leaves a net sown area of 55 to 65 per cent.

4.135 Salem has about 40 per cent of cropped area under irrigation and in the remaining area this percentage is 15 to 30.

4.136 This annual average rainfall is 85 cm in 53 rainy days. October is the month of maximum rainfall and there are three to four months with more than 10 cm pm rainfall. The total of two consecutive months including the month of maximum and the preceding or following (whichever has higher rainfall) is about 35 per cent annual rainfall.

4.137 Almost the entire Zone grows paddy though the area under the crop does not exceed 17 per cent of the cropped area. Groundnut, ragi and other pulses are dominant crops. In Mettur and Omalur taluks, paddy area does not come up to even 10 per cent. In Sankari and Tiruchengode, groundnut occupies 40 to 45 per cent of cropped area. Ragi covers 25 per cent of the cropped area in Mettur and Omalur; Salem, Rasipuram, Sankari and Tiruchengode and Namakkal form the groundnut belt of this Zone. In Krishnagiri, Dharmapuri and Mettur, other pulses are important crops and occupy 17 to 22 per cent area.

4.138 The Relative Yield Index values of important crops are given below :

District	*Rice*	*Jowar Kharif*	*Jowar Rabi*	*Bajra*	*Ragi*	*Small millets*	*Total pulses*	*Ground-nut*
Salem	175	132	163	130	130	146	43	133
Dharmapuri	155	150	186	127	108	129	43	134

The yields are good and well above the all-India average.

4.139 As in many other Zones of the State, sheep dominate in this Zone too. Only in Namakkal, sheep constitute 26 per cent and goats 29 per cent of livestock population. The livestock population in this Zone could be grouped into the following three patterns :

$G_4\ S_4\ Cm_4\ Cf_4$

$S_4\ G_4\ Cm_4\ Cf_4$

$S_3\ G_4\ Cm_4\ Cf_4$

5 OBSERVATIONS FOR FUTURE CROPPING PATTERNS

General

5.1 In the foregoing sections we have dealt with in detail the rainfall, cropping and livestock patterns which emerge from the existing information. We have also categorised the rainfall patterns into zones and discussed how the other patterns feature in those zones. Among other information, that on soils, which ought to play an important role in determining cropping patterns, is lacking in such details as are wanted for this analysis. Data on orography and population density have featured in this analysis but their exact role on cropping and livestock patterns could not be brought out owing to lack of detailed information. We are, however, convinced that studies and analysis indicated in the preceding sections are important for the guidance they may give in deciding cropping and livestock patterns vis a vis rainfall patterns. The greater the accuracy of the primary information and the more detailed such information is, the more useful the data would be in drawing up the most efficient cropping and livestock patterns in an area or a zone. With this purpose in view the following procedures are suggested :

(i) Delineation of rainfall zones;

(ii) Identification of the existing cropping patterns;

(iii) Assessment of area needed for each crop and its ideal distribution;

(iv) Comparison of (iii) with (ii) in order to determine possible changes; and

(v) Consideration of other related factors like soil, irrigation facilities, density of population, livestock patterns and then arriving at the future cropping patterns.

5.2 The methods of delineating rainfall patterns or zones and cropping patterns have been fully discussed in Section 2. For the purpose of locating suitable areas for a crop, soil and topography of the land are important factors. The approximate area to be put under each crop will be decided by the demand for it not only at State level but at the national level, either for internal consumption or for the purpose of export. The departments responsible for crop planning of a State should, therefore, be cognisant of the demand for a crop, so that production efforts are not rendered

futile because of lack of demand and marketing. We have already discussed the part each of the factors mentioned in items (v) of para 5.1 is likely to play in deciding cropping patterns. For this purpose not only detailed data but also knowledge about the correlation between those factors and crop performance would be necessary. Knowledge gained, through long experience, by farmers would also be most helpful.

5.3 We may mention that the rainfall intervals which form the basis of identifying rainfall patterns are subject to minor modifications. Thus, the condition that 30 cm of rainfall for three consecutive months is good for paddy may not be rigorously adhered to. If the soil is favourable with a high water retention capacity or, what is more important, water management is efficient and water use economic, rainfall lower than 30 cm pm for three consecutive months may sustain a good crop of paddy.

5.4 The choice of a cropping pattern is not decided by the farmer only on technical grounds. He is also guided by the profitability of the crops or requirements for his household consumption. Farmers may not be inclined to accept a crop unless the necessary inputs and infrastructure are assured. Of all the inputs water is the most important as is made evident by the spread of groundnut in the country, sugarcane in Gujarat, maize and cotton in Karnataka and recently of wheat in West Bengal. These are excellent instances of the manner of introduction of new crops in the cropping patterns of a State or a region.

Some Observations pertaining to Tamil Nadu

5.5 The criterion of 30 cm of rainfall per month for at least three consecutive months needed for a good growth of rice is not satisfied in any part of this State. Even then, three crops of rice are taken in a year and the performance of all of them is very good when compared with the all-India average yield level, the Relative Yield Index being between 170 and 180. This is because the crop is given the best of attention. There is no doubt that better varieties and better crop production technology would become available in course of time and, therefore, it should be possible to cut the rice area at least to a small extent without detriment to total production. The irrigation water thus saved from rice crop could be utilized for growing many other important crops.

5.6 There is ample justification for the State to take increasingly to the cultivation of fodder crops, vegetables and fruits. Maize also could be encouraged. The yield standards of cotton and groundnut crops are already good in this State. Because of this reason, it is desirable to increase area under these crops. Some new oilseed crops can also be tried and introduced in the State.

5.7 Growing of tapioca is possible in many parts of the country. Tamil Nadu is one such State where the area under this crop could be easily increased. The hills on the western side of the State offer good scope for increasing production of potato. Of the plantation crops, the State could try cacao, clove and nutmeg.

APPENDIX 1

Talukwise Land Use (1969-70) and Population Statistics

TAMIL NADU

(Per cent of reporting area)

District/taluk	Population 1971 Total	Population 1971 Per sq km	Forests	Nac	Cw	Pp&gl	Mtc&g	Fallow lands	Net area sown
	Rainfall Zone—I	..	..	..	..	*Rainfall Pattern—E_4 (C_2 D_1 E_1) A_1 B_1 C_1 E_1*			
Chingleput									
Ponneri	177711	250	—	27	9	6	8	13	37
Saidapet	693059	1168	3	35	4	7	9	17	25
S. Arcot									
Cuddalore	664831	573	2	26	7	1	—	2	62
Chidambaram	497296	476	1	6	1	.3	2	25	64
Thanjavur									
Sirkali	212954	482	1	18	3	1	—	6	71
	Rainfall Zone—II	..	..	..	*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) A_1 B_1 C_1 E_1*				
Thanjavur									
Mayuram	415667	568	—	20	1	.5	.5	4	74
Nannilam	303343	403	—	16	3	1	1	3	76
	Rainfall Zone—III	..	..	..	..	*Rainfall Pattern—E_4 (D_2 E_2) A_1 B_2 E_1*			
Thanjavur									
Nagapattinam	322401	622	—	18	6	1	1	2	72
Thiruttaraipundi	320850	250	8	32	2	1	3	4	50
	Rainfall Zone—IV	..	..	..	*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_1 E_2*				
S. Arcot									
Gingee	295896	279	12	20	5	1	1	8	53
N. Arcot									
Wandiwash	239620	273	3	25	7	2	1	10	52
	Rainfall Zone—V	..	..	..	*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_2 E_1*				
S. Arcot									
Vridhachalam	407196	273	5	20	5	.4	—	8	62
Tiruchirapalli									
Ariyalur	661710	948	2	23	5	1	1	5	63
Udayarpalayam	263358	281	7	14	8	Neg	2	6	63
Thanjavur									
Kumbakonam	430399	785	—	17	4	1	1	1	77
Papanasam	263050	445	—	16	3	.4	.4	4	76
Mannargudi	319768	409	—	12	2	1	.1	10	75
Pattukottai	263121	248	.2	18	5	1	7	7	61
Orathanady	227850	253	3	16	1	1	3	9	67

— = nil or negligible
Nac = not available for cultivation
Cw = culturable waste
Pp&gl = permanent pastures and other grazing lands
Mtc&g = miscellaneous tree crops and groves not included in net area sown

APPENDIX 1 (*Contd.*)

District/taluk	Population 1971 Total	Population 1971 Per sq km	Forests	Nac	Cw	Pp&gl	Mtc&g	Fallow lands	Net area sown
	Rainfall Zone—VI				..	*Rainfall Pattern—D_1 E_3 (E_4) B_1 C_2 E_1*			
Ramanathapuram									
Ramanathapuram	245248	283	—	24	3	—	—	30	43
Tirunelveli									
Tiruchendur	336133	402	7	21	17	1	9	15	30
Nanguneri	373628	205	12	21	13	3	1	27	23
Tirunelveli	419005	497	2	23	16	4	1	29	25
Ambasamudram	333960	259	46	13	2	3	1	17	17
	Rainfall Zone—VII		..	..	..	*Rainfall Pattern—E_4 (C_2 D_2) B_2 C_1 E_1*			
Chingleput									
Tiruvallur	223667	209	—	27	4	6	2	28	33
Sriperumbudur	338095	427	4	27	4	4	3	12	47
Kanchipuram	273255	421	—	39	2	1	2	7	48
Chingleput	317308	281	14	33	1	6	9	8	30
Maduranthakam	327721	239	2	21	17	11	7	7	34
S. Arcot									
Tindivanam	402861	274	1	16	5	1	10	11	56
Villipuram	423530	465	1	19	4	2	1	8	64
	Rainfall Zone—VIII		..	..	..	*Rainfall Pattern—E_4 (E_4) C_2 D_1 E_1*			
Tirunelveli									
Tuticorin	221465	646	.2	17	13	14	2	15	39
Srivaikuntam	175146	294	4	22	8	9	5	9	43
	Rainfall Zone—IX		..	..	..	*Rainfall Pattern—D_1 E_3 (C_2 D_2) C_1 D_1 E_2*			
N. Arcot									
Vaniyambadi	339202	460	19	9	5	1	—	10	56
Tiruppattur	314564	274	16	16	—	1	—	27	40
Dharamapuri									
Uthangarai	139423	219	11	9	1	2	.1	11	66
	Rainfall Zone—X		..	..	..	*Rainfall Pattern—D_1 E_3 (E_4) C_2 E_2*			
Coimbatore									
Coimbatore	956671	699	26	15	·2	—	—	12	47
Dharmapuram	376520	208	1	9	8	5	—	35	42
Palladam	479921	317	—	7	9	1	0·4	17	66
	Rainfall Zone—XI		..	..	..	*Rainfall Pattern—D_1 E_3 (D_2 E_2) C_2 D_1 E_1*			
Ramanathapuram									
Aruppukottai	225377	219	—	16	3	—	—	10	71
Paramakudi	177246	247	—	12	14	—	—	16	58
Mudukalathur	158768	266	3	8	2	.1	1	22	64
Thiruvadanai	166244	173	1	21	18	1	.1	9	49
	Rainfall Zone—XII		..	..	..	*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) C_2 D_1 E_1*			
Tiruchirapalli									
Lalgudi	305292	316	3	20	5	3	2	7	60
Musiri	234438	240	21	21	2	3	2	5	46
Kulithalai	291049	228	2	15	7	5	.1	17	53
Tiruchirapalli	661710	948	·3	33	10	2	2	10	43
Thuraiyar	225074	288	3	17	12	4	.4	5	55
Manapparai	224254	199	17	17	3	·5	·5	19	43

APPENDIX 1 (*Contd.*)

District/taluk	Population 1971		Forests	Nac	Cw	Pp&gl	Mtc&g	Fallow lands	Net area sown
	Total	Per sq km							
	Rainfall Zone—XIII	..		..	..	*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) C_2 D_1 E_1*			
S. Arcot									
Tirukoilur	456637	302	11	18	2	—	1	14	55
Kallakurichi	469476	209	10	37	9	1	1	3	39
Tiruchirapalli									
Perambalur	340306	195	10	15	6	3	1	11	54
Dharamapuri									
Harur	280197	137	39	11	2	1	0·3	8	38
Salem									
Attur	389485	231	21	23	11	2	3	8	33
	Rainfall Zone—XIV	..		..	..	*Rainfall Pattern—D_1 E_3 (C_2 D_2)C_2 D_1 E_1*			
Thanjavur									
Thanjavur	438609	468	—	26	6	1	—	5	63
Arantangi	202401	196	1	53	2	—	0·3	2	42
Tiruchirapalli									
Kulathur	214909	90	3	29	4	2	0·5	16	46
Alangudi	244335	272	9	22	7	1	3	8	51
Thirumayam	197443	207	14	28	9	1	0·4	17	31
N. Arcot									
Arkonam	311147	370	2	22	9	2	2	17	46
Walajahpet	253329	391	3	28	4	1	1	22	40
Cheyyar	230279	272	1	26	0·4	7	1	13	52
Gudiyatham	426205	392	36	15	6	1	3	2	37
Vellore	415265	413	60	4	4	0·4	—	1	30
Arni	182247	381	6	25	3	1	·3	13	52
Polur	292954	199	44	9	1	·3	·3	·3	45
Chengam	265004	157	43	17	2	1	0·2	5	32
Tiruvannamalai	314245	324	10	14	3	2	1	17	54
Chingleput									
Tiruttani	125538	282	2	29	4	3	5	14	42
	Rainfall Zone—XV	..		..	..	*Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 E_2*			
Coimbatore									
Gopichettipalayam	481690	165	52	5	3	·2	1	8	32
Bhavani	317253	214	60	1	·2	1	1	1	36
Avanashi	343118	269	30	10	1	1	·4	5	54
Erode	621553	400	1	11	2	2	1	23	61
	Rainfall Zone—XVI	..		..	..	*Rainfall Pattern—D_2 E_2 (D_1 E_3) C_2 D_1 E_1*			
Madurai									
Uthamapalayam	437017	324	36	7	2	·1	—	8	48
Kodaikanal	71433	72	63	19	·1	—	—	2	17
Palani	342676	219	4	14	2	3	1	18	58
Coimbatore									
Udumalpet	273824	191	40	10	—	—	—	8	42
Tiruchirapally									
Karur	396307	251	·2	14	11	5	1	12	57

APPENDIX 1 (*Concld.*)

District/taluk	Population 1971 Total	Population 1971 Per sq km	Forests	Nac	Cw	Pp&gl	Mtc&g	Fallow lands	Net area sown
	Rainfall Zone—XVI (concld.)		..	..	..	*Rainfall Pattern—D_2E_2 (D_1E_3) $C_2D_1E_1$*			
Tirunelveli									
Kovilpatty	221460	229	2	12	1	2	1	19	63
Vilathikulam	147491	134	—	9	1	1	1	26	63
Ramanathapuram									
Sattur	263117	286	1	12	2	1	.1	18	66
Srivilliputhur	198202	397	1	23	6	1	2	15	51
Tirunelveli									
Sankaranayanarkoil	257058	239	—	14	.2	.4	—	35	51
	Rainfall Zone—XVII		..	..	..	*Rainfall Pattern—D_2 E_2 $(D_2$ $E_2)$ C_2 D_1 E_1*			
Madurai									
Vedasandur	208480	202	9	13	5	3	0.2	26	44
Dindigul	501790	391	15	8	1	—	9	11	56
Nilakottai	337502	317	15	14	3	.1	—	24	44
Usilampatti	299880	229	21	22	1	4	1	18	33
Tirumangalam	218076	280	·2	19	1	—	—	12	68
Periyakulam	373048	246	35	11	4	—	·1	11	39
	Rainfall Zone—XVIII		..	..	..	*Rainfall Pattern—D_2 E_2 $(C_2$ $D_2)$ C_2 D_1 E_1*			
Madurai									
Madurai (S)	740075	2519	—	28	2	—	—	24	46
Madurai (N)	170375	423	4	25	1	·3	1	9	59
Melur	287825	230	18	18	4	1	3	13	43
Ramanathapuram									
Tiruppathur	198661	209	11	23	14	·2	·2	12	40
Sivaganga	181887	164	4	38	4	·2	—	25	28
	Rainfall Zone—XIX		..	..	..	*Rainfall Pattern—C_1 E_3 $(C_1$ $D_3)$ C_1 D_1 E_2*			
Dharamapuri									
Hosur	163826	129	35	25	.2	1	1	2	36
Denkanikotta	212254	119	39	24	.2	1	·4	3	33
	Rainfall Zone—XX		..	..	..	*Rainfall Pattern—C_1 E_3 $(C_2$ $D_2)$ C_1 D_1 E_2*			
Dharmapuri									
Krishnagiri	396162	275	28	13	·3	1	·1	2	57
Dharmapuri	339549	306	2	18	3	3	·4	9	64
Salem									
Salem	775116	1232	4	14	2	3	·4	17	59
Mettur	251759	392	6	25	2	·2	·4	8	59
Omalur	258144	483	3	15	2	1	1	13	66
Sankari	289846	385	5	10	2	1	1	20	61
Rosepuram	221562	411	4	22	4	3	4	12	51
Namakkal	480875	276	18	8	3	4	3	5	58
Tiruchangoda	295013	364	—	12	2	1	·2	9	77

APPENDIX 2

Talukwise Livestock Population—1966

TAMIL NADU

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and Donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
Rainfall Zone—I .. .. .. *Rainfall Pattern—E_4 (C_2 D_1 E_1) A_1 B_1 C_1 E_1*													
Chingleput													
Ponneri	28	16	10	5	9	6	16	15	—	0·2	—	1·2	106
	(26)	(16)	(9)	(4)	(9)	(5)	(15)	(14)	—	(0·2)	—	(1)	
Saidapet	26	20	10	7	20	10	17	15	0·2	0·4	—	3·6	129
	(20)	(15)	(8)	(5)	(16)	(7)	(13)	(12)	(0·2)	(0·3)	—	(3)	
Madras													
Madras	2·2	14	9	0·7	15	5	0·7	5	0·1	—	—	1·2	52
	(4)	(26)	(17)	(2)	(28)	(9)	(2)	(10)	(0·3)	(—)	—	(2)	
S. Arcot													
Cuddalore	61	61	42	7	10	5	17	57	0·1	·8	—	8	268
	(23)	(23)	(16)	(3)	(4)	(2)	(6)	(21)	—	(0·3)	—	(3)	
Chidambaram	81	51	50	16	21	13	14	49	0·2	—	0·1	5·7	301
	(27)	(17)	(17)	(5)	(7)	(4)	(5)	(16)	(0·1)	—	—	(1·9)	
Thanjavur													
Sirkali	27	16	14	1	7	5	2	24	0·1	0·1	—	0·5	96
	(28)	(16)	(14)	(1)	(7)	(5)	(2)	(25)	(0·1)	(0·1)	—	(1)	
Rainfall Zone—II .. .. *Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) A_1 B_1 C_1 E_1*													
Thanjavur													
Mayuram	59	38	27	7	20	15	6	50	—	—	—	1·0	224
	(26)	(17)	(12)	(3)	(9)	(7)	(3)	(22)	—	—	—	(0·4)	
Nannilam	40	31	24	6	15	9	9	49	1	—	—	0·3	184
	(22)	(17)	(13)	(3)	(8)	(5)	(5)	(27)	(—)	(—)	(—)	(0·0)	
Rainfall Zone—III .. .. *Rainfall Pattern—E_4 (D_2 E_2) A_1 B_2 E_1*													
Thanjavur													
Nagapattinam	31	28	21	7	13	8	8	49	0·1	0·2	—	0·3	165
	(19)	(17)	(13)	(4)	(8)	(5)	(5)	(28)	(0·1)	(0·1)	—	(12)	
Thiruttaraipundi	36	37	29	6	15	10	17	95	—	0·7	—	1	246
	(15)	(15)	(12)	(2)	(6)	(4)	(7)	(39)	—	(0·1)	—	(·4)	
Rainfall Zone—IV .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_1 E_2*													
S. Arcot													
Gingee	88	46	21	5	6	4	61	37	—	0·2	—	11	281
	(32)	(17)	(7)	(2)	(2)	(1)	(22)	(13)	(—)	(0·0)	(—)	(4)	
N. Arcot													
Wandiwash	62	34	19	3	7	5	64	13	—	—	—	9	223
	(29)	(16)	(9)	(1)	(3)	(2)	(30)	(6)	(—)	(—)	(—)	(4)	
Rainfall Zone—V .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_2 E_1*													
S. Arcot													
Virudhachalam	66	60	34	8	14	8	61	79	—	—	—	16	345
	(19)	(17)	(10)	(2)	(4)	(2)	(18)	(23)	(—)	(—)	(—)	(5)	
Tiruchirapalli													
Ariyalur Udayarpalayam	92	67	37	6	29	17	79	108	—	0·2	—	15	450
	(20)	(15)	(8)	(1)	(6)	(4)	(18)	(25)	(—)	(—)	(—)	(3)	

NOTE : Figure in brackets represent percentage to total livestock.

APPENDIX 2 (*Contd.*)

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and Donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
Rainfall Zone—V (concld.) .. .. .. *Rainfall Patterns—D_1E_3 ($C_2D_1E_1$) $B_1C_2E_1$*													
Thanjavur													
Kumbakonam	41 (35)	29 (25)	9 (8)	6 (5)	20 (17)	2 (2)	— (—)	10 (8)	— (—)	— (—)	— (—)	0·3 (0·3)	118
Papanapam	43 (32)	22 (16)	18 (13)	3 (2)	12 (9)	7 (5)	7 (5)	25 (18)	— (—)	— (—)	— (—)	0·3 (0·2)	138
Mannargudi	62 (27)	36 (16)	31 (13)	9 (4)	21 (9)	15 (6)	15 (6)	41 (18)	— (—)	0·2 (0·1)	— (—)	1 (0·3)	230
Pottukkottai	80 (31)	52 (20)	34 (13)	5 (2)	17 (6)	12 (5)	37 (14)	24 (9)	— (—)	0·4 (0·2)	— (—)	1 (0·3)	262
Orathanadi	41 (21)	22 (10)	16 (8)	7 (4)	11 (6)	7 (4)	82 (42)	9 (5)	— (—)	0·1 (0·1)	— (—)	1 (0·1)	185
Rainfall Zone—VI .. .. *Rainfall Pattern—D_1 E_3 (E_4) B_1 C_2 E_1*													
Ramanathapuram													
Ramanathapuram	13 (14)	10 (10)	7 (7)	1 (1)	3 (3)	2 (2)	40 (40)	21 (22)	— (—)	1 (1)	— (—)	0·1 (0·1)	98
Tirunelveli													
Tiruchendur	17 (12)	18 (12)	14 (10)	2 (1)	4 (3)	2 (1)	43 (29)	44 (29)	— (—)	3 (2)	— (—)	1 (1)	148
Nanguneri	57 (15)	31 (8)	20 (6)	4 (1)	14 (4)	10 (3)	189 (51)	36 (10)	— (—)	2 (1)	— (—)	3 (1)	368
Tirunelveli	23 (13)	14 (8)	12 (7)	2 (1)	13 (1)	8 (4)	83 (47)	21 (12)	— (—)	1 (—)	— (—)	2 (1)	179
Ambasamudam	34 (20)	22 (13)	17 (10)	8 (4)	15 (8)	14 (8)	44 (25)	18 (10)	— (—)	2 (1)	— (—)	2 (1)	177
Rainfall Zone—VII .. .. *Rainfall Pattern—E_4 (C_2 D_2) B_2 C_1 E_1*													
Chingleput													
Tiruvallur	48 (27)	30 (17)	17 (10)	7 (4)	15 (9)	7 (4)	32 (18)	18 (10)	— (—)	0·4 (0·2)	— —	2 (1)	177
Sriperumbudur	42 (26)	23 (14)	17 (10)	6 (4)	18 (10)	10 (6)	32 (19)	16 (10)	0·4 (0·2)	0·3 (0·2)	— —	2 (1)	165
Kanchipuram	38 (26)	23 (16)	17 (12)	7 (5)	12 (9)	10 (7)	24 (16)	11 (8)	— (—)	0·3 (0·2)	— —	2 (1)	144
Chingleput	44 (21)	36 (17)	20 (9)	17 (8)	13 (6)	11 (5)	40 (19)	25 (12)	3 (1)	0·4 (0·2)	— —	2 (1)	210
Maduramthakam	79 (27)	59 (20)	34 (11)	7 (2)	16 (5)	8 (3)	60 (20)	32 (10)	— (—)	0·3 (0·1)	— (—)	5 (2)	300
S. Arcot													
Tindivanam	76 (26)	52 (18)	30 (11)	5 (2)	8 (3)	4 (1)	60 (21)	43 (15)	— (—)	1 (0·3)	— (—)	8 (3)	287
Villipuram	69 (24)	62 (22)	37 (13)	6 (2)	7 (3)	4 (1)	38 (14)	48 (17)	— (—)	1 (0·3)	— —	12 (4)	284
Rainfall Zone—VIII .. .. *Rainfall Pattern—E_4 (E_4) C_2 D_1 E_1*													
Tirunelveli													
Tuticorin Srivaikuntnam	27 (13)	18 (9)	16 (8)	8 (4)	11 (5)	7 (4)	72 (35)	40 (20)	— —	2 (1)	— (—)	2 (1)	204
Rainfall Zone—IX .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_2) C_1 D_2 E_2*													
N. Arcot													
Vaniyambadi	32 (24)	27 (20)	13 (9)	2 (2)	6 (4)	2 (2)	36 (27)	13 (9)	— (—)	1 (1)	— (—)	3 (2)	144
Tiruppattur	41 (25)	38 (24)	17 (10)	1 (1)	3 (2)	1 (1)	46 (28)	10 (6)	0·1 (0·1)	1 (1)	— (—)	3 (2)	161
Dharamapuri													
Uthangarai													

APPENDIX 2 (*Contd.*)

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and Donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
	Rainfall Zone—X			..	..		..	..	*Rainfall Pattern—D_1 E_3 (E_4) C_2 E_2*				
Coimbatore													
Coimbatore	40	32	28	3	24	18	36	31	1	2	—	4	219
	(18)	(15)	(13)	(1)	(11)	(8)	(17)	(14)	(0·4)	(1)	(—)	(2)	
Dharamapuram	38	78	55	1	15	13	260	52	1	3	—	7	522
	(7)	(15)	(11)	(0·1)	(3)	(2)	(50)	(10)	(0·1)	(1)	(—)	(1)	
Palladam	39	32	25	2	25	20	90	32	0·4	2	—	4	271
	(14)	(12)	(9)	(1)	(9)	(7)	(33)	(12)	(0·1)	(1)	(—)	(2)	
	Rainfall Zone—XI			..	..		..	..	*Rainfall Pattern—D_1 E_3 (D_2 E_2) C_2 D_1 E_1*				
Ramanathapuram													
Aruppukottai	35	17	10	1	5	3	59	40	—	1	—	2	173
	(20)	(10)	(6)	(·5)	(3)	(2)	(34)	(23)	(—)	(·5)	(—)	(1)	
Paramakudi	33	13	9	0·4	3	2	70	11	—	1	—	0·4	142
	(23)	(9)	(6)	(0·3)	(2)	(1)	(49)	(8)	(—)	(1)	(—)	(0·3)	
Mudukalathur	35	16	9	2	3	2	160	44	—	2	—	1	274
	(13)	(6)	(3)	(1)	(1)	(1)	(58)	(16)	(—)	(1)	(—)	(—)	
Thiruvadanai	39	23	14	3	5	3	104	19	—	1	—	0·3	209
	(19)	(11)	(7)	(1)	(2)	(1)	(50)	(9)	(—)	(0·4)	(—)	(—)	
	Rainfall Zone—XII			..	..		..		*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) C_2 D_1 E_1*				
Tiruchirapalli													
Lalgudi	43	25	21	3	16	9	42	60	—	0·3	—	4	224
	(19)	(11)	(10)	(1)	(7)	(4)	(19)	(27)	(—)	(0·1)	(—)	(2)	
Musiri	76	25	21	5	22	13	97	84	—	0·3	—	10	354
	(22)	(7)	(6)	(1)	(6)	(4)	(27)	(24)	(—)	(0·1)	(—)	(3)	
Kulithalai	82	72	27	4	26	14	177	112	—	1	—	6	521
	(16)	(14)	(5)	(1)	(5)	(3)	(34)	(21)	(—)	(0·2)	(—)	(1)	
Tiruchirapalli	27	22	24	4	12	8	22	24	—	1	—	2	145
	(19)	(16)	(16)	(3)	(8)	(6)	(15)	(16)	(—)	(0·4)	(—)	(1)	
Manapurai													
Thuraiyur	(21)	(16)	(10)	(—)	(—)	(—)	(33)	(12)	(—)	(—)	(—)	(—)	
	Rainfall Zone—XIII			..	..		..		*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) C_2 D_1 E_1*				
S. Arcot													
Tirukoilur	86	85	43	8	10	5	61	48	—	0·2	—	18	364
	(24)	(23)	(12)	(2)	(3)	(1)	(17)	(13)	(—)	(0·1)	(—)	(5)	
Kallakurichi	106	60	30	7	10	7	109	43	—	—	—	20	392
	(27)	(15)	(8)	(2)	(2)	(2)	(28)	(11)	(—)	(—)	(—)	(5)	
Tiruchirapalli													
Perambalur	73	29	17	3	15	11	144	94	—	0·1	—	15	405
	(18)	(7)	(4)	(1)	(4)	(3)	(36)	(23)	(—)	(—)	(—)	(4)	
Dhramapuri													
Harur	51	66	26	1	9	6	75	34	—	1	—	1	271
	(19)	(24)	(9)	(0·4)	(4)	(2)	(28)	(13)	(—)	(0·4)	(—)	(0·4)	
Salem													
Attur	80	27	13	4	11	7	80	37	0·1	0·1	(—)	12	273
	(29)	(10)	(5)	(2)	(4)	(3)	(29)	(14)	(—)	(—)	(—)	(4)	

APPENDIX 2 (*Contd.*)

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
Rainfall Zone—XIV .. .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_2) C_2 D_1 E_1*													
Thanjavur													
Thanjavur	53	39	30	5	16	9	20	37	—	0·2	—	2	212
	(25)	(18)	(14)	(3)	(8)	(4)	(10)	(17)	(—)	(0.1)	(—)	(1)	
Arantangi	41	22	16	7	11	7	82	9	—	0·1	—	1	196
	(21)	(11)	(8)	(4)	(6)	(4)	(42)	(4)	(—)	(—)	(—)	(0·3)	
Tiruchirapalli													
Kulathur	45	39	18	4	10	6	120	40	—	0·4	—	1	282
	(16)	(14)	(6)	(1)	(4)	(2)	(42)	(14)	(—)	(0·1)	(—)	(0·5)	
Alangudi	43	22	13	4	9	5	31	27	—	0·3	—	1	155
	(28)	(14)	(8)	(3)	(6)	(3)	(20)	(17)	(—)	(0·2)	(—)	(1)	
Thirumayam	36	27	18	2	7	5	56	20	—	1	—	—	172
	(21)	(16)	(10)	(1)	(4)	(3)	(33)	(12)	(—)	(0·3)	(—)	(—)	
N. Arcot													
Arkonam	59	30	18	12	14	9	57	9	—	1	—	8	223
	(27)	(14)	(8)	(6)	(7)	(4)	(26)	(4)	(—)	(0·3)	(—)	(4)	
Walajahpet	63	23	13	9	14	9	73	10	—	0·4	—	6	227
	(28)	(11)	(6)	(4)	(6)	(4)	(33)	(5)	(—)	(0·2)	(—)	(3)	
Cheyyar	60	27	18	9	10	8	53	12	—	0·1	—	6	209
	(30)	(13)	(9)	(4)	(5)	(4)	(26)	(6)	(—)	(0·1)	(—)	(3)	
Gudiyatham	58	33	22	6	13	9	50	21	0·2	1	—	5	227
	(27)	(15)	(10)	(2)	(6)	(4)	(23)	(10)	(0.1)	(1)	(—)	(2)	
Vellore	48	30	18	12	12	9	39	19	—	1	—	4	192
	(25)	(6)	(9)	(6)	(6)	(5)	(20)	(10)	(—)	(1)	(—)	(2)	
Arni	30	11	6	3	5	3	26	6	—	—	—	3	97
	(32)	(12)	(7)	(3)	(4)	(4)	(27)	(7)	(—)	(—)	(—)	(4)	
Polur	78	41	19	6	9	5	56	16	—	0·3	—	8	245
	(33)	(17)	(8)	(3)	(4)	(2)	(24)	(6)	(—)	(0·1)	(—)	(3)	
Chengam	67	59	22	7	7	4	86	25	—	0·1	—	10	298
	(23)	(21)	(8)	(2)	(2)	(1)	(30)	(9)	(—)	(—)	(—)	(4)	
Tiruvannamalai	51	32	18	3	5	3	53	12	—	—	—	6	190
	(28)	(18)	(10)	(1)	(3)	(1)	(29)	(6)	(—)	(—)	(—)	(4)	
Chingleput													
Tiruttani	24	15	9	4	6	4	26	6	—	0·3	—	3	95
	(25)	(16)	(9)	(4)	(6)	(4)	(27)	(6)	(—)	(0·4)	(—)	(3)	
Rainfall Zone—XV .. .. .. *Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 E_2*													
Coimbatore													
Gopichettipalayam	82	61	42	8	30	18	96	54	0·4	3	—	7	401
	(20)	(15)	(11)	(2)	(8)	(4)	(24)	(13)	(0·1)	(1)	(—)	(2)	
Bhavani	56	32	19	17	15	10	62	24	1	1	—	3	241
	(23)	(13)	(8)	(7)	(7)	(4)	(26)	(10)	(0·3)	(1)	(—)	(1)	
Avarashi	41	30	20	2	20	15	65	38	0·2	2	—	4	238
	(17)	(12)	(9)	(1)	(8)	(6)	(28)	(16)	(0·1)	(1)	(—)	(2)	
Erode	66	72	47	6	35	27	147	63	1	2	—	6	472
	(14)	(15)	(10)	(1)	(8)	(6)	(31)	(13)	(0·2)	(0·4)	(—)	(1)	
Rainfall Zone—XVI .. .. .. *Rainfall Pattern—D_2 E_2 (D_1 E_3) C_2 D_1 E_1*													
Madurai													
Uthamapalayam	—	—	—	—	—	—	—	—	—	—	—	—	—
Kodaikanal	5	5	2	0·2	1	0·3	1	3	1	—	—	—	17
	(27)	(31)	(10)	(1)	(5)	(2)	(3)	(16)	(5)	(—)	(—)	(—)	

APPENDIX 2 (*Contd.*)

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and Donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
Rainfall Zone—XVI (contd.) .. .. .. *Rainfall Pattern—D_2 E_2 (D_1 E_3) C_1 E_1*													
Palani	33	35	19	3	18	14	89	39	0·4	3	4	—	259
	(13)	(14)	(7)	(1)	(7)	(5)	(35)	(15)	(0·1)	(1)	(2)	(—)	
Coimbatore													
Udumalpet	29	24	17	1	9	6	37	19	0·1	2	4	—	219
	(20)	(16)	(12)	(1)	(6)	(4)	(25)	(13)	(0·1)	(1)	(2)	(—)	
Tiruchirapally													
Karur	28	52	23	1	20	15	198	58	0·2	2	6	—	404
	(7)	(13)	(6)	(0·2)	(5)	(4)	(49)	(14)	(—)	(0·2)	(2)	(—)	
Tirunelvelli													
Kovilpatti	50	23	19	1	16	10	154	102	0·2	4	—	6	387
	(13)	(6)	(5)	(0·3)	(4)	(3)	(40)	(26)	(0·1)	(1)	(—)	(2)	
Vilathikulam	—	—	—	—	—	—	—	—	—	—	—	—	—
Ramanathapuram													
Sattur	30	12	9	1	15	10	103	45	0·1	2	—	5	234
	(13)	(5)	(4)	(1)	(7)	(4)	(44)	(19)	(—)	(1)	(—)	(2)	
Srivilliputhur	24	19	11	1	12	7	50	17	—	2	—	4	147
	(16)	(13)	(7)	(1)	(8)	(5)	(34)	(12)	(—)	(1)	(—)	(3)	
Tirunelveli													
Sankaranayanarkoil	46	18	13	2	18	13	141	38	0·1	3	—	8	300
	(15)	(6)	(4)	(1)	(6)	(4)	(47)	(13)	(—)	(1)	(—)	(3)	
Rainfall Zone—XVII ... . *Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 D_1 E_1*													
Madurai													
Vedasandur	—	—	—	—	—	—	—	—	—	—	—	—	—
Dindigul	76	80	26	6	29	20	169	75	0·4	3	—	7	491
	(16)	(16)	(5)	(1)	(6)	(4)	(34)	(15)	(0·1)	(1)	(—)	(2)	
Nilakottai	41	34	16	6	9	7	37	26	—	1	—	3	180
	(23)	(19)	(9)	(3)	(5)	(4)	(21)	(14)	(—)	(1)	(—)	(1)	
Usilampatti	—	—	—	—	—	—	—	—	—	—	—	—	—
Tirumangalam	82	46	25	7	28	19	164	78	—	3	—	11	464
	(18)	(10)	(5)	(2)	(6)	(5)	(36)	(17)	(—)	(1)	(—)	(2)	
Periyakulam	93	59	39	6	24	20	59	58	0·4	4	—	11	374
	(25)	(16)	(10)	(2)	(6)	(5)	(16)	(16)	(0·1)	(1)	(—)	(3)	
Rainfall Zone—XVIII .. .. .. *Rainfall Pattern—D_2 E_2 (C_2 D_2) C_2' D_1 E_1*													
Madurai													
Madurai	36	22	20	6	14	6	26	12	0·1	1	—	1	152
	(23)	(20)	(13)	(4)	(9)	(4)	(17)	(8)	(0·1)	(1)	(—)	(1)	
Melur	78	55	26	8	11	7	95	41	—	2	—	3	327
	(24)	(17)	(8)	(2)	(3)	(2)	(29)	(13)	(—)	(1)	(—)	(1)	
Ramanathapuram													
Tiruppathur	36	37	24	3	7	5	70	55	—	1	—	2	242
	(15)	(16)	(10)	(1)	(3)	(2)	(29)	(23)	(—)	(0·3)	(—)	(1)	
Sivaganga	68	46	25	9	13	8	122	37	—	1	—	2	330
	(21)	(14)	(7)	(3)	(4)	(2)	(37)	(11)	(—)	(0·3)	(—)	(1)	
Rainfall Zone—XIX .. .. .. *Rainfall Pattern—C_1 E_3 (C_1 D_3) C_1 D_1 E_2*													
Dharmapuri													
Hosur	36	117	60	1	9	4	93	35	1	2	—	2	360
	(10)	(32)	(17)	(0·4)	(2)	(1)	(26)	(10)	(0·1)	(1)	(—)	(1)	
Denkanikotta	—	—	—	—	—	—	—	—	—	—	—	—	—
Rainfall Zone—XX .. .. .. *Rainfall Pattern—C_1 E_3 (C_2 D_2) C_1 D_1 E_2*													
Dharmapuri													
Krishnagiri	79	115	45	3	9	6	132	67	0·2	2	—	5	462
	(17)	(25)	(10)	(1)	(2)	(1)	(29)	(14)	(—)	(—)	(—)	(1)	
Dharmapuri	55	95	28	3	13	9	129	66	0·2	2	—	3	405
	(14)	(24)	(7)	(1)	(3)	(2)	(32)	(16)	(0·1)	(—)	(—)	(1)	

APPENDIX 2 *(Concld.)*

(thousands)

District/taluk	Cattle			Buffaloes			Sheep	Goats	Horses & ponies	Mules and donkeys	Camels	Pigs	Total live-stock
	Male	Female	Young stock	Male	Female	Young stock							
	Rainfall Zone—XX (concld.)			..		..		..	*Rainfall Pattern—C_1 E_3 (C_2 D_2) C_1 D_1 E_2*				
Salem													
Salem	55	39	18	1	11	9	53	29	1	1	—	9	226
	(24)	(17)	(8)	(1)	(5)	(4)	(23)	(13)	(0·3)	(0·3)	(—)	(4)	
Mettur	15	20	11	0·2	4	4	48	11	—	0·3	—	1	114
	(13)	(17)	(10)	(0·2)	(3)	(4)	(42)	(10)	(—)	(0·1)	(—)	(1)	
Omalur	37	43	19	1	12	10	80	32	0·1	1	—	3	239
	(16)	(18)	(8)	(0·4)	(5)	(4)	(34)	(14)	(—)	(0·3)	(—)	(1)	
Sankari	31	20	10	1	9	6	57	30	—	0·4	—	1	165
	(19)	(12)	(6)	(—)	(5)	(4)	(35)	(18)	(—)	(—)	(—)	(1)	
Rasipuram	39	24	14	1	13	12	25	36	0·2	0·3	—	12	176
	(22)	(14)	(7)	(1)	(7)	(7)	(14)	(21)	(0·1)	(0·3)	(—)	(7)	
Namakkal	75	41	24	5	33	24	121	134	0·2	1	—	12	471
	(16)	(8)	(5)	(1)	(7)	(5)	(26)	(29)	(—)	(0·2)	(—)	(3)	
Tiruchengode	36	24	18	1	14	13	105	47	0·1	1	—	5	264
	(14)	(9)	(7)	(—)	(5)	(5)	(40)	(18)	(—)	(0·2)	(—)	(2)	

APPENDIX 3

Rainfall and Cropping Patterns

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Cropping patterns	District	Taluk	Area in sq km	Elevation masl		Annual total rain-fall (cm)	Annual number of rainy days	Month of maxi-mum rainfall	Rainfall in two consecutive months includ-ing the month of maximum plus the preceding or succeeding month which-ever is higher		Consecutive Months*		
				maxi	mini				cm	rainy days	(a)	(b)	(c)
		Rainfall Zone—I		..	..		..	*Rainfall Pattern—E_4 (C_2 D_1 E_1) A_1 B_1 C_1 E_1*					
Pd_1	Chingleput	Ponneri	710	8	SL	124	54	11′	64	20	8—5	1	
		Saidapet	593	71	SL	132	54	11	67	20	8—5	117	38
	Madras	Madras	128	SL	SL	n a							
		Chidambaram	1046	10	SL	143	58	11	67	21	8—5	113	42
	Thanjavur	Sirkali	442	16	SL	139	57	11	68	22	8—5	112	43
Pd_3 Gn_4 B_4R_5	South Arcot	Cuddalore	1160	97	SL	135	56	11	65	22	8—5	107	41
		Rainfall Zone—II		..	..		..	*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) A_1 B_1 C_1 E_1*					
Pd_1	Thanjavur	Mayuram	732	16	SL	129	55	11′	62	22	8—5	101	41
		Nannilam	753	5	SL	125	54	11′	57	21	9—4	88	34
		Rainfall Zone—III		..	..		..	*Rainfall Pattern—E_4 (D_2 E_2) A_1 B_2 E_1*					
Pd_1	Thanjavur	Nagappatti-nam	622	5	SL	137	55	11	69	21	10—12	93	31
		Thirutharai-pundi	1285	13	SL	121	57	11′	54	23	9—4	84	36
		Rainfall Zone—IV		..	..		..	*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_1 E_2*					
Pd_3 Gr_3	S. Arcot	Gingee	1061	307	150	108	54	11′	40	19	8—4	72	34
	N. Arcot	Wandiwash	879	311	150	113	56	11′	42	18	7—6	94	45
		Rainfall Zone—V		..	.		..	*Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_2 E_1*					
Pd_4 Mt_4 Gn_4Jk_4/B_4	S. Arcot	Viruddachalam	1491	100	50	109	55	11	41	18	8—4	65	34
	Tiruchirapalli	Ariyalur	994	78	16	96	52	10′	30	16	8—4	58	30
		Uddayar palayam	937	n a									
Pd_1	Thanjavur	Kumbakonam	549	41	5	110	51	11′	44	19	8—5	82	37
		Papanasam	591	47	41	105	51	11′	43	20	8—5	76	36
		Mannargudi	781	47	32	115	55	11′	45	20	8—5	85	40
		Pattukkottai	1063	37	13	107	57	11′	42	20	8—5	77	40
Pd_2Gn_2		Orathanadu	899	57	37	n a							

* = Consecutive months with rainfall of more than 10 cm per month.

a = Initial month with more than 10 cm of rainfall and number of consecutive months with more than 10 cm per month separated by hyphen.

b = Total rainfall of consecutive months under 'a' in cm.

c = Total number of rainy days of consecutive months under 'a'.

masl = metres above sea-level.

SL = sea-level.

NOTES : 1. Information on rainfall and rainy days based on Memoirs of India Meteorological Department, Vol. XXXI Part III.

2. For explanation of coded form of rainfall and cropping patterns, reference may be made to section 2 in the text.

APPENDIX 3 (*Contd.*)

Cropping patterns	District	Taluk	Area in sq km	Elevation masl.		Annual total rainfall (cm)	Annual number of rainy days	Month of maximum rainfall	Rainfall in two consecutive months including the month of maximum plus the preceding or succeeding month whichever is higher		Consecutive Months*		
				maxi	mini				cm	rainy days	(a)	(b)	(c)
		Rainfall Zone—VI ..		..		..			*Rainfall Pattern—D_1 E_3 (E_4) $B_1C_2E_1$*				
Pd_3 Mt_4- B_4 L_4	Ramanathapuram	Ramanathapuram	866	6	SL	87	43	11′	45	20	10—3	58	25
Pd_3 Pu_5 Gn_5 S_4	Tirunelveli	Tiruchendur	837	150	SL	75	35	11	39	16	10—3	52	22
Pd_3 Pu_4 Fr_4	Tirunelveli	Nanguneri	1826	150	SL	78	48	11′	36	19	10—3	47	25
Pd_1		Tirunelveli	842	150	150	80	45	11′	37	19	10—3	50	25
Pd_1		Ambasamudram	1291			98	56	11′	43	20	10—3	60	29
		Rainfall Zone—VII ..		..		..			*Rainfall Pattern—$E_4(C_2D_2)B_2C_1E_1$*				
Pd_2 Gn_4 Pd_1	Chingleput	Tiruvallur	1072	150	103	111	57	11′	46	18	7—6	93	46
		Sriperumbudur	792	148	103	106	53	11′	45	18	8—5	81	37
		Kanchipuram	650	205	103	111	55	11′	43	18	7—6	92	44
		Chingleput	1130	235	SL	121	56	11′	51	20	7—6	104	46
Pd_2 Gn_4		Maduranthakam	1374	149	SL	124	56	11′	52	20	8—5	97	40
Pd_3 Gn_4 Mt_4	S. Arcot	Tindivanam	1468	138	SL	113	56	11′	40	19	8—4	72	34
Pd_3 Gn_4 $Mt_4/B_4/Jk_4$		Villupuram	911	100	10	116	56	11′	45	19	8—5	87	39
		Rainfall Zone—VIII ..		..		..			*Rainfall Pattern—E_4 (E_4) $C_2D_1E_1$*				
C_3 B_3 Mt_4 F_4/Pd_4	Tirunelveli	Tuticorin	343	9	SL	60	30	11′	32	15	10—2	32	15
Pd_3 C_4 B_4		Srivaikuntam	595	150	SL	67	39	11′	33	18	10—3	43	23
		Rainfall Zone—IX ..		..		..			*Rainfall Pattern—D_1 E_3 (C_2 D_2) C_1 D_1 E_2*				
Pd_4 Gn_4 Mt_4 Jk_4 R_4	N. Arcot	Vaniyambadi	737	788	450	79	49	9	29	16	8—3	40	22
(S_4/Pu_4)		Tiruppattur	1150	1175	404	87	54	9	29	17	8—3	43	24
Pu_4 Mt_4 Jk_4 Pd_5	Dharmapuri	Uthangarai	638	380	300	85	49	9	30	16	8—4	54	29
		Rainfall Zone—X ..		..		..			*Rainfall Pattern—D_1 E_3 (E_4) C_2 E_2*				
Jk_3 C_4 Pu_4 Gn_4	Coimbatore	Coimbatore	1368	1996	300	61	45	10	27	17	10—2	27	17
Pu_4 Jr_4 Pd_4 B_4/Mt_4		Dharmapuram	1806	823	299	61	36	10	29	16	10—2	29	16
Jk_3 C_3		Palladam	1516	411	303	59	35	10	28	15	10—2	28	15

APPENDIX 3 (*Contd.*)

Cropping pattern	District	Taluk	Area in sq km	Elevation (masl) maxi	Elevation (masl) mini	Annual total rainfall (cm)	Annual number of rainy-days	Month of maximum rainfall	Rainfall in two consecutive months including the month of maximum plus the preceding or succeeding month whichever is higher: cm	rainy days	Consecutive Months* (a)	(b)	(c)
		Rainfall Zone—XI		..	..	..	*Rainfall Pattern—D_1 E_3 (D_2 E_2) C_2 D_1 E_1*						
C_4 Mt_4 Pd_4 F_4 B_4	Ramanathapuram	Aruppukottai	1031	108	48	80	44	10	33	16	10—2	33	16
Pd_4 Gn_4/R_4		Paramakudi	716	32	6	81	47	11′	33	17	10—2	33	17
Pd_3 B_4 Mt_4 C_4/L_4		Mudukalathur	597	13	SL	72	41	11′	34	18	10—2	34	18
Pd_1		Thiruvadanai	962	86	SL	85	46	11′	38	18	10—2	38	18
		Rainfall Zone—XII		..	..		*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) C_2 D_1 E_1*						
Pd_3 Jk_4 B_4	Tiruchirapalli	Lalgudi	966	94	47	87	45	10	35	17	8—4	47	28
Pd_4 Jk_4 B_4 Gn_4		Musiri	978	150	94	75	43	10	31	16	9—3	41	22
Pd_4 B_4 Jr_4 Gn_4 Mt_4		Kulithalai	1277	491	94	77	45	10	32	17	9—3	42	23
Pd_3 Gn_3		Tiruchirapalli	698	94	47	87	47	10	33	18	8—4	55	29
Pd_3 Jk_4 B_4 Jr_4 Gn_4		Thuraiyar	781	1018	150	86	45	10	31	16	9—3	45	23
Jk_4 Pd_4 Mt_4 Gn_5		Manapparai	1128	491	300	88	44	10	34	17	9—3	46	23
		Rainfall Zone—XIII		..	..		*Rainfal Pattern—D_1 E_3 (C_2 D_1 E_1) C_2 D_1 E*						
Pd_3 Gn_4 B_4	S. Arcot	Tirukoilur	1513	104	50	102	53	10	37	17	8—4	66	32
Pd_3 Gn_4 Jk_4		Kallakurichi	2248	1298	50	104	56	10	37	18	8—4	65	34
Jk_3 Pd_4 Mt_4	Tiruchirapalli	Perambalur	1741	600	117	100	54	10	37	18	8—4	62	31
Pu_4 Mt_4 Jk_4 Pd_5	Dharmapuri	Harur	2042	600	300	79	52	10′	28	17	9—2	28	17
Pd_3 Mt_4 Jk_5 Jr_5	Salem	Attur	1686	1298	150	98	56	10′	35	18	8—4	61	56
		Rainfall Zone—XIV		..	..		.. *Rainfall Pattern—D_1 E_3 (C_2 D_2) C_2 D_1 E_1*						
Pd_2	Thanjavur	Thanjavur	936	94	47	97	49	11′	35	18	8—5	70	35
Pd_1 Gn_4		Anantangi	1031	36	SL	90	55	11′	33	19	8—5	63	37
Pd_3 Mt_4	Tiruchirapalli	Kulathur	2388	151	102	87	46	10	30	16	8—4	53	28
Gn_4		Alangudi	896	102	53	95	52	11′	31	17	8—4	54	30
Pd_2 Gn_4		Thirumayam	956	1018	150	95	55	10	29	17	8—4	58	31
Pd_2 Gn_4	N. Arcot	Arkonam	842	103	90	103	56	11′	38	18	7—5	75	41
Pd_3 Gn_4		Walajawpet	648	283	150	100	53	11′	35	17	8—4	65	33
Pd_3 Gn_3		Cheyyar	848	311	131	104	54	11′	42	18	7—6	93	46
Gn_3 Pd_4S_4		Gudiyatham	1088	705	150	86	53	10′	30	17	8—4	55	31
Gn_4 Pd_4		Vellore	1005	835	300	105	56	11′	36	18	7—5	78	39
Pd_2 Gn_3		Arni	478	900	150	100	53	10—11	35	16	7—5	75	38
Pd_2 Gn_4		Polur	1470	969	150	104	57	10—9	37	18	8—4	67	35
Pd_3 Gn_3		Chengam	1690	1121	300	100	53	10	36	18	8—4	64	33
		Tiruvannamalai	970	452	150	104	54	10—11	35	18	8—4	67	33
	Chingleput	Tiruttani	445	300	150	n a							

APPENDIX 3 (*Contd.*)

Cropping patterns	District	Taluk	Area in sq km	Elevation masl. maxi	Elevation masl. mini	Annual total rain-fall (cm)	Annual number of rainy days	Month of maxi-mum rain-fall	Rainfall in two con-secutive months includ-ing the month of maximum plus the preceding or succeeding month which-ever is higher: cm	rainy days	Consecutive Months* (a)	(b)	(c)
		Rainfall Zone—XV		..	..		..	*Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 E_2*					
Pd_4 B_4 Gn_4 Jk_4 R_4	Coimbatore	Gopichettipalayam	2923	1500	300	79	49	10	31	17	9—3	41	24
		Bhavani	1483	1500	300	81	51	10	29	17	9—3	40	24
Jk_4 C_4 Pu_5 Gn_4		Avanashi	1278	1918	300	73	46	10	29	16	10—2	29	16
Pd_4 Gn_4 Jk_4		Erode	1553	188	166	79	48	10	29	16	9—3	39	22
		Rainfall Zone—XVI		..	..		..	*Rainfall Pattern—D_2 E_2 (D_1 E_3) C_2 D_1 E_1*					
Jk_3 Gn_3 Pd_4	Madurai	Uthamapalayam	1350	1500	150	74	55	10	32	19	10—2	32	19
Fr_3 L_4 Pt_4		Kodaikanal	989	2505	450	167	106	10—11	51	28	4—9	150	97
Jr_3 Pu_4 Mt_4		Palani	1563	2234	300	76	44	10—11	37	19	10—2	37	19
C_4 Jk_4 Pu_4 Mt_4 Pd_4	Coimbatore	Udumalpet	1437	2513	300	64	39	10	33	16	10—2	33	16
B_3 O_4 JK_4	Tiruchirapalli	Karur	1577	197	154	65	40	10	27	15	10—2	29	15
C_3 B_3 Mt_4 F_4	Tirunelveli	Kovilpatti	968	100	SL	72	44	10—11	33	19	10—2	33	19
B_4 C_4		Vilathikulam	1104	48	SL	68	40	10	33	18	10—2	33	18
C_4 B_4	Ramanathapuram	Sattur	920	108	50	73	41	10	34	17	10—2	34	17
Pd_4 B_4 C_4 Mt_4		Sivilliputhur	500	2019	100	86	47	10	41	19	10—2	41	19
C_4 Mt_4 B_4	Tirunelveli	Sankaranayanarkoil	1075	1500	150	78	45	11—10	36	19	10—2	36	19
		Rainfall Zone—XVII		..	..		..	*Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 D_2 E_2*					
B_4 Jk_4 Mt_4 Gn_4	Madurai	Vedasandur	1032	1031	300	74	44	10	32	18	10—2	32	18
Jk_4 Gn_4 Mt_4													
Pd_4 Jr_4		Dindigul	1282	1359	300	85	54	10	34	19	9—3	54	25
Pd_4 Gn_4 Jk_4 Pu_4/Jr_4		Nilakottai	1063	900	230	80	50	10	31	18	9—3	52	24
Pd_4 Jk_4 Gn_4		Usilampatti	1090	1301	300	93	48	10	40	19	9—3	51	24
C_4 Mt_4 Pd_4 Gn_4/F_4		Tirumangalam	778	100	100	87	48	10	34	17	8—4	54	28
Jk_4 Mt_4 Pd_4C_4		Periyakulam	1514	1800	450	88	55	10	35	19	10—2	35	19
		Rainfall Zone—XVIII		..	..		..	*Rainfall Pattern—D_2 E_2 (C_2 D_2) C_2 D_1 E_1*					
Pd_3 Jk_4	Madurai	Madurai (South)	294	150	100	89	52	10	33	18	8—4	57	31
Pd_1		Madurai (North)	403	149	100								
Pd_3 Gn_4		Melur	1254	956	150	95	54	10	34	18	8—4	59	32
Pd_2 Pu_4 Gn_4	Ramanathapuram	Tiruppathur	952	167	50	98	56	10	33	18	8—4	59	32
Pd_3 Gn_4		Sivaganga	1110	100	50	90	51	10	32	17	8—4	55	29
		Rainfall Zone—XIX		..	..		..	*Rainfall Pattern—C_1 E_3 (C_1 D_3) C_1 D_1 E_2*					
R_3 Pu_4	Dharmapuri	Hosur	1275	904	900	79	52	10	28	17	9—2	28	17
		Denkanikotta	1786	1395	242	86	57	10	30	17	9—2	30	17

APPENDIX 3 (*Concld.*)

Cropping patterns	District	Taluk	Area in sq km	Elevation masl. maxi	Elevation masl. mini	Annual total rain-fall (cm)	Annual number of rainy days	Month of maxi-mum rain-fall	Rainfall in two con-secutive months including the month of maximum plus the preceding or succeeding month which-ever is higher: cm	Rainfall in two consecutive months: rainy days	Consecutive Months* (a)	Consecutive Months* (b)	Consecutive Months* (c)
		Rainfall Zone—XX	..		..		..	*Rainfall Pattern—C_1 E_3 (C_2 D_2) C_1 D_1 E_2*					
Pd_4 Gn_4 Mt_4 Jk_4 Pu_4	Dharmapuri	Krishnagiri	1470	757	450	83	50	9	29	16	8—3	40	22
Pu_4 Mt_4 Jk_4 R_4		Dharmapuri	1111	1279	450	85	52	10′	29	17	8—4	51	29
Gn_4 Pd_4 Mt_4 Jk_4	Salem	Salem	629	1500	300	96	61	10′	31	18	7—5	66	41
R_4 Jk_4 Pu_4 Gn_4		Mettur	642	1200	300	n a							
		Omalur	535	890	300	90	59	10′	30	17	8—3	44	26
Gn_3 Jk_4 R_4 Pd_4		Sankari	761	714	300	80	49	10′	27	15	8—3	38	21
Gn_4 Pd_4 Mt_4 Jr_4		Rasipuram	539	1421	300	85	55	10′	28	17	8—4	51	32
B_4 Gn_4 Jr_4 Pd_4		Namakkal	1741	841	150	79	48	10′	27	16	8—4	48	29
Gn_3 Jk_4 B_4 Pd_4		Tiruchengode	811	500	300	78	51	10	26	16	8—4	46	29

APPENDIX 4

Area under Principal Crops (Per cent of Gross Cropped Area)

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District/taluk	Gross cropped area (000 ha)	Pd	Jk	Jr	B	M	R	W	Ba	Mt	G	T	Pu	S	Ga	O	C	L	Misc.
Rainfall Zone—I .. .. .. *Rainfall Pattern—E_4 (C_2 D_1 E_1) A_1 B_2 C_1 E_1*																			
Chingleput																			
Ponneri	39·7	76	—	—	1	—	4	—	—	—	—	—	0·3	—	4	0·1	—	0·1	14
Saidapet	18·2	73	—	—	0·3	—	4	—	—	—	—	—	—	—	2	—	—	1	20
Madras																			
Madras	n a																		
South Arcot																			
Cuddalore	95·9	30	0·3	—	13	—	8	—	—	2	—	0·2	3	5	15	1	—	1	22
Chidambram	90·6	79	1	—	2	—	1	—	—	1	—	0·1	1	1	5	1	—	0·3	8
Thanjavur																			
Sirkali	49·8	75	0·1	0·1	0·2	—	0·2	—	—	—	—	—	7	0·2	2	2	—	1	12
Rainfall Zone—II .. .. .. *Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) A_1 B_1 C_1 E_1*																			
Thanjavur																			
Mayuram	92·7	67	—	—	0·1	0·2	0·2	—	—	—	—	—	4	0·4	0·4	2	—	1	25
Nanilam	73·2	90	—	—	—	—	—	—	—	—	—	—	5	1	—	2	—	1	1
Rainfall Zone—III *Rainfall Pattern—E_4 (D_2 E_2) A_1 B_2 E_1*																			
Nagapattinum	54·6	83	—	—	—	—	—	—	—	—	—	—	4	1	—	0·2	—	1	11
Thirutharaipundi	72·0	86	—	—	—	—	0·1	—	—	—	—	—	2	1	1	1	—	4	6
Rainfall Zone—IV .. .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) R_1 C_1 E_2*																			
South Arcot																			
Gingee	70·4	40	2	0·3	3	—	4	—	—	2	—	2	1	1	40	2	—	—	3
North Arcot																			
Wandiwash	55·4	45	1	—	0·1	—	2	—	—	4	—	2	1	2	41	0·1	—	—	2
Rainfall Zone—V .. .. .. *Rainfall Pattern—D_1 E_3 (C_2 D_1 E_1) B_1 C_2 E_1*																			
South Arcot																			
Vriudhachalam	100·4	29	15	1	7	—	1	—	—	14	—	1	2	6	12	6	—	0·1	6
Tiruchirapalli																			
Ariyalur	64·7	17	18	4	8	0·5	0·5	—	—	19	—	0·5	0·5	3	10	4	—	—	15
Vdayarpalayam	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Thanjavur																			
Kumbakonam	95·9	51	—	—	0·3	0·4	1	—	—	—	—	—	6	2	1	1	—	2	35
Papanasam	68·8	76	0·2	0·1	0·1	—	0·4	—	—	—	—	—	8	2	1	1	—	2	9
Mannargud	73·7	88	0·2	0·1	—	—	0·2	—	—	—	—	—	2	3	3	1	—	1	2
Pattukottai	85·8	76	—	—	—	1·5	1	—	—	0·2	—	—	—	0·1	10	1·5	—	8	2
Orathanad	70·4	62	—	—	0·2	2	6	—	—	6	—	—	3	0·2	16	1	—	1	3
	Rainfall Zone—VI			..		..			..		..		*Rainfall Pattern—D_1 E_3 (E_4) B_1 C_2 E_1*						
Ramanathapuram																			
Ramanathapuram	36·8	46	0·2	—	11	—	5	—	—	8	—	—	1	4	—	3	—	10	12
Tirunelveli																			
Tiruchandur	36·8	37	1	—	1	—	0·2	—	—	—	—	—	7	16	6	1	1	3	27
Nanguneri	47·3	38	5	2	1	—	0·4	—	—	3	—	—	24	4	6	1	2	1	13
Tirunelveli	33·2	68	5	1	1	—	2	—	—	4	—	—	3	2	0·3	1	4	0·3	9
Ambasamudram	38·0	72	1	2	—	—	0·4	—	—	1	—	—	5	2	2	6	3	2	4
	Rainfall Zone—VII			..		..			..		..		*Rainfall Pattern E_4 (C_2 D_2) B_2 C_1 E_1*						
Chingleput																			
Tiruvallur	55·8	59	0·4	—	3	—	5	—	—	0·4	—	—	1	0·2	23	—	—	—	9
Sriprumbudur	57·1	75	0·2	—	1	—	6	—	—	1	—	0·1	1	0·2	7	—	—	0·3	8
Kancheepuram	49·0	81	—	—	0·1	—	4	—	—	0·4	—	—	0·4	1	9	—	—	0·2	4
Chingleput	48·6	77	—	—	—	—	7	—	—	—	—	—	—	1	2	—	—	0·1	13
Maduranthakam	72·8	64	0·1	—	0·3	—	5	—	—	3	—	—	0·4	1	10	—	—	2	15
South Arcot																			
Tindivanam	95·1	35	2	1	2	—	4	—	—	9	0·1	—	0·5	0·5	27	2	0·1	0·5	17
Vilupuram	76·9	47	1	—	7	—	9	—	—	1	—	0·4	0·5	7	18	4	1	0·1	4
	Rainfall Zone—VIII					..			..		..		*Rainfall Pattern—E_4 (E_4) C_2 D_1 E_2*						
Tirunelveli																			
Tuticorin	14·2	14	—	3	28	—	1	—	—	—	—	—	6	3	0·3	0·3	37	—	8
Srivaikuntham	33·2	47	—	0·3	10	—	0·4	—	—	1	—	—	6	3	0·4	0·4	15	0·2	17
	Rainfall Zone—IX					..			..		..		*Rainfall Pattern—D_1 E_3 (C_2 D_2) C_1 D_1 E_2*						
North Arcot																			
Vaniyambadi	42·1	20	11	—	5	0·1	6	—	—	10	—	2	9	12	11	1·0	—	10	3
Tiruppattur	51·4	16	14	—	6	—	7	—	—	15	—	3	10	6	19	2	—	—	2
Dharamapuri																			
Uthangarai	48·6	7	8	—	3	—	8	—	—	24	—	1	26	1	17	1	1	1	2

Pd =paddy
Jk =jowar kharif
Jr =jowar rabi
B =bajra
M =maize
R =ragi
W =wheat
Ba =barley
Mt =small millets
G =gram
T =tur
Pu =other pulses
S =sugarcane
Gn =groundnut
O =other oilseeds
C =cotton
L =plantations
F =fodder
Misc.=miscellaneous crops
na=not available

NOTE : The percentage figures have been rounded off individually and hence cross totals may not, in some cases, add up to 100.

APPENDIX 4 (*Contd*)

District/taluk	Gross cropped area (000 ha)	Pd	Jk	Jr	B	M	R	W	Ba	Mt	G	T	Pu	S	Gn	O	C	L	Misc.
	Rainfall Zone—X												*Rainfall Pattern—D_1 E_3 (E_4) C_2 E_2*						
Coimbatore																			
Coimbatore	71·6	4	39	3	1	2	2	—	—	4	1	1	9	6	11	0·1	13	2	2
Dharapuram	100·0	9	11	17	17	0·1	4	—	—	2	—	0·3	21	2	2	6	6	0·3	3
Palladam	106·0	2	45	2	2	1	2	—	—	1	—	0·3	13	0·3	2	1	24	0·2	4
	Rainfall Zone—XI												*Rainfall Pattern—D_1 E_3 (D_2 E_2) C_2 D_1 E_1*						
Ramanathapuram																			
Aruppukottai	75·3	13	0·3	3	17	—	3	—	—	11	—	0·1	2	0·1	7	11	25	—	18
Paramakudi	41·7	64	0·4	—	3	—	11	—	—	9	—	—	0·4	—	0·3	3	0·3	0·1	8
Mudukalathur	38·0	33	9	—	9	—	3	—	—	17	—	—	4	—	4	—	16	—	4
Thiruvadanai	48·2	80	—	—	—	—	4	—	—	12	—	—	1	—	1	0·2	1	1	1
	Rainfall Zone—XII												*Rainfall Pattern—D_1 E_3 (C_1 D_1 E_2) $C_2D_1E_1$*						
Tiruchirapalli																			
Lalgudi	63·9	42	17	0·4	11	—	1	—	—	0·1	—	2	1	6	7	3	1	1	8
Musiri	50·6	26	23	2	17	1	—	—	—	1	—	2	1	2	18	2	1	1	3
Kulittalai	85·8	19	6	11	17	—	1	—	—	8	—	9	3	4	10	6	1	0·5	5
Tiruchirapalli	56·2	48	3	—	0·3	—	0·3	—	—	1	—	0·1	0·5	0·5	38	2	0·1	1	5
Thuraiyar	51·8	29	13	20	12	—	2	—	—	4	—	1	2	1	10	1	0·3	0·2	5
Manaparai	47·8	15	21	3	8	—	3	—	—	16	—	0·3	13	1	8	1	8	3	—
	Rainfall Zone—XIII												*Rainfall Pattern—D_1 E_1 (C_2 D_1 E_1) $C_2D_1E_1$*						
South Arcot																			
Tirukoilur	101·6	39	4	—	18	—	3	—	—	4	—	1	1	1	24	2	0·2	—	2
Kallakurichi	100·8	36	10	2	8	—	1	—	—	8	—	1	1	4	24	1	—	0·1	4
Tiruchirapalli																			
Perambalur	103·2	18	36	0·5	8	—	1	—	—	16	—	1	1	2	5	2	1	—	9
Dharamapuri																			
Harur	75·7	11	20	—	1	—	11	—	—	25	—	0·5	23	1	2	0·5	1	0·5	3
Salem																			
Attur	59·9	40	5	9	4	—	1	—	—	11	—	0·3	5	3	3	1	—	1	17
	Rainfall Zone—XIV												*Rainfall Pattern—D_1 E_3 (C_2D_2)C_2 D_1 E_1*						
Thanjavur																			
Thanjavur	79·3	66	—	—	0·2	1	0·5	—	—	9	—	—	3	0·5	6	0·5	—	5	8
Arantangi	49·4	78	—	—	—	2	1	—	—	2	—	—	0·2	—	13	2	—	2	—

Tiruchirapalli																			
Kulathar	53·0	48	5	1	1	—	8	—	—	16	—	1	5	1	11	—	1	1	1
Alangudi	37·2	42	0·3	0·2	1	4	5	—	—	18	—	1	1	0·1	8	1	—	—	18
Thirumayam	36·4	50	0·3	—	1	0·2	4	—	—	6	—	0·3	1	0·3	27	1	1	—	8
North Arcot																			
Arkonam	51·8	53	1	—	2	—	6	—	—	1	—	1	1	1	30	2	—	—	2
Walajapet	32·8	46	10	—	3	—	7	—	—	1	—	2	1	4	24	1	—	0·4	1
Cheyyar	43·3	38	3	—	—	—	3	—	—	5	—	2	1	1	40	2	—	—	6
Gudiyatham	50·6	23	1	8	0·2	0·1	6	—	—	0·2	—	2	1	13	34	1	—	3	8
Vellore	35·6	26	8	8	2	0·2	6	—	—	5	—	3	2	6	29	2	—	1	2
Arni	32·0	51	5	—	3	—	3	—	—	1	—	1	0·5	1	33	1	—	0·3	—
Polur	66·8	50	3	1	4	0·1	5	—	—	4	—	2	2	1	27	1	—	0·2	—
Changan	68·0	33	5	—	3	0·1	4	—	—	10	—	2	4	3	32	1	0·1	0·3	2
Tiruvennamalai	66·4	42	2	—	3	—	2	—	—	2	—	2	2	2	42	0·2	—	—	1
Chingleput																			
Tiruttami	26·3	42	2	—	11	—	·11	—	—	1	—	1	1	1	25	—	—	—	5
	Rainfall Zone—XV			..			..			..		..	*Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 E_2*						
Coimbatore																			
Gopichettipalayam	111·3	19	14	0·3	15	0·1	9	—	—	4	—	0·4	6	4	14	2	7	0·2	5
Avanashi	73·7	3	39	3	5	0·1	2	—	—	6	—	1	9	3	14	1	10	1	3
Bhavani	55·8	18	9	4	12	0·1	12	—	—	4	—	0·4	3	8	19	3	2	0·2	5
Erode	110·1	27	15	7	9	—	2	—	—	—	—	0·3	2	4	20	3	7	1	3
	Rainfall Zone—XVI			..			..			..		..	*Rainfall Pattern—D_2 E_2 (D_1 E_3) C_2 D_1 E_1*						
Madurai																			
Uthamapalayam	73·2	16	35	3	0·5	—	6	—	—	7	—	0·4	0·5	0·1	16	0·5	3	4	8
Kodaikanal	17·4	5	—	—	—	0·3	0·3	2	—	3	—	—	1	—	—	—	0·1	21	67
Palani	94·7	9	4	32	3	—	1	—	—	16	—	0·5	19	2	5	1	3	0·5	4
Coimbatore																			
Udumalpet	67·2	12	15	4	1	3	4	—	—	11	1	0·2	12	5	8	0·3	19	1	14
Tiruchirapalli																			
Karur	87·4	6	11	4	45	—	2	—	—	0·5	—	0·5	4	4	—	17	0·5	0·5	2
Tirunelveli																			
Kovilpatti	63·9	4	—	4	29	—	3	—	—	5	—	0·3	2	0·1	1	1	28	—	4
Vilathikulam	71·6	2	—	1	38	—	2	—	—	11	—	0·1	5	3	1	—	22	—	15
Ramanathapuram																			
Sattur	63·1	3	0·1	1	26	—	3	—	—	5	—	1	3	0·1	2	1	24	—	31
Srivithipathur	29·1	24	4	—	10	—	4	—	—	15	—	0·3	3	4	8	7	10	3	8
Tirunelveli																			
Sankaragrarayankoil	60·7	9	4	5	16	—	5	—	—	15	—	1	9	1	2	2	17	0·1	4

APPENDIX 4 (*Concld.*)

District/taluk	Gross Cropped area (000 ha)	Pd	Jk	Jr	B	M	R	W	Ba	Mt	G	T	Pu	S	Gn	O	C	L	Misc.
	Rainfall Zone—XVII				..		..			..		..	*Rainfall Pattern—D_2 E_2 (D_2 E_2) C_2 D_1 E_1*						
Madurai																			
Vedasandur	48·2	5	16	8	19	—	1	—	—	13	—	1	6	0·4	18	8	1	0·2	3
Dindigul	77·3	10	21	10	1	—	1	—	—	13	—	0·5	3	2	17	4	1	5	12
Nilakottai	55	28	20	8	3	—	0·3	—	—	9	—	1	2	4	9	4	1	2	1
Usilampatti	40·1	18	12	8	8	—	2	—	—	6	—	—	1	2	21	1	9	0·1	16
Tirumangalam	53·8	14	8	2	5	—	2	—	—	22	—	0·1	1	0·3	16	0·4	24	—	5
Periyakulam	67·2	14	27	1	5	—	2	—	—	10	—	0·1	4	1	9	4	10	1	12
	Rainfall Zone—XVIII				..		..			..		..	*Rainfall Pattern—D_2 E_2 (C_2 D_2) C_2 D_1 E_1*						
Madurai																			
Madurai (South)	13·8	48	11	—	3	—	3	—	3	9	9	—	1	3	9	3	—	3	2
Madurai (North)	28·7	90	1	—	1	—	1	—	—	—	0·3	—	1	2	1	0·2	—	1	2
Melur	56·7	45	4	1	2	—	4	—	—	5	—	0·5	4	3	20	0·3	2	4	5
Ramanathapuram																			
Tiruppathur	40·1	51	1	—	2	—	5	—	—	—	4	—	10	0·1	22	2	0·3	—	2
Sivaganga	32·0	45	2	—	1	—	8	—	—	—	6	—	3	5	12	—	—	—	18
	Rainfall Zone—XIX				..		..			..		..	*Rainfall Pattern—C_1 E_3 (C_1 D_3) C_1 D_1 E_2*						
Dharmapuri																			
Hasur	51·0	6	3	—	4	0·4	38	—	—	4	—	1	27	0·2	4	9	—	—	3
Denkankotta	63·9	6	3	—	1	8	51	—	—	3	—	0·2	16	1	4	7	—	—	—
	Rainfall Zone—XX				..		..			..		..	*Rainfall Pattern—C_1 E_3 (C_2 D_2) C_1 D_1 E_2*						
Dharamapuri																			
Krishnagiri	98·7	17	11	1	4	—	7	—	—	12	—	2	17	1	16	1	0·1	2	9
Dharampuri	81·3	7	16	3	5	—	15	—	—	19	—	1	22	2	6	1	0·3	0·1	3
Salem																			
Salem	43·3	22	13	4	3	0·2	4	—	—	10	—	1	6	4	17	1	1	1	13
Mettur	39·7	4	12	—	9	—	23	—	—	9	—	0·3	20	0·4	11	4	1	2	4
Omalur	38·8	8	19	—	5	—	19	—	—	6	—	1	12	3	17	3	3	1	2
Sankari	55·4	15	11	0·2	9	—	10	—	—	1	—	1	2	2	44	3	0·3	0·3	2
Rasipuram	38·0	16	7	10	1	—	3	—	—	11	—	0·2	4	2	18	0·2	1	0·4	26
Namakkal	100·0	11	8	12	20	—	2	0·1	—	1	—	0·5	1	3	26	1	4	1	9
Tiruchengoda	60·3	10	16	1	20	—	2	—	—	0·5	—	0·5	1	2	40	2	3	—	3

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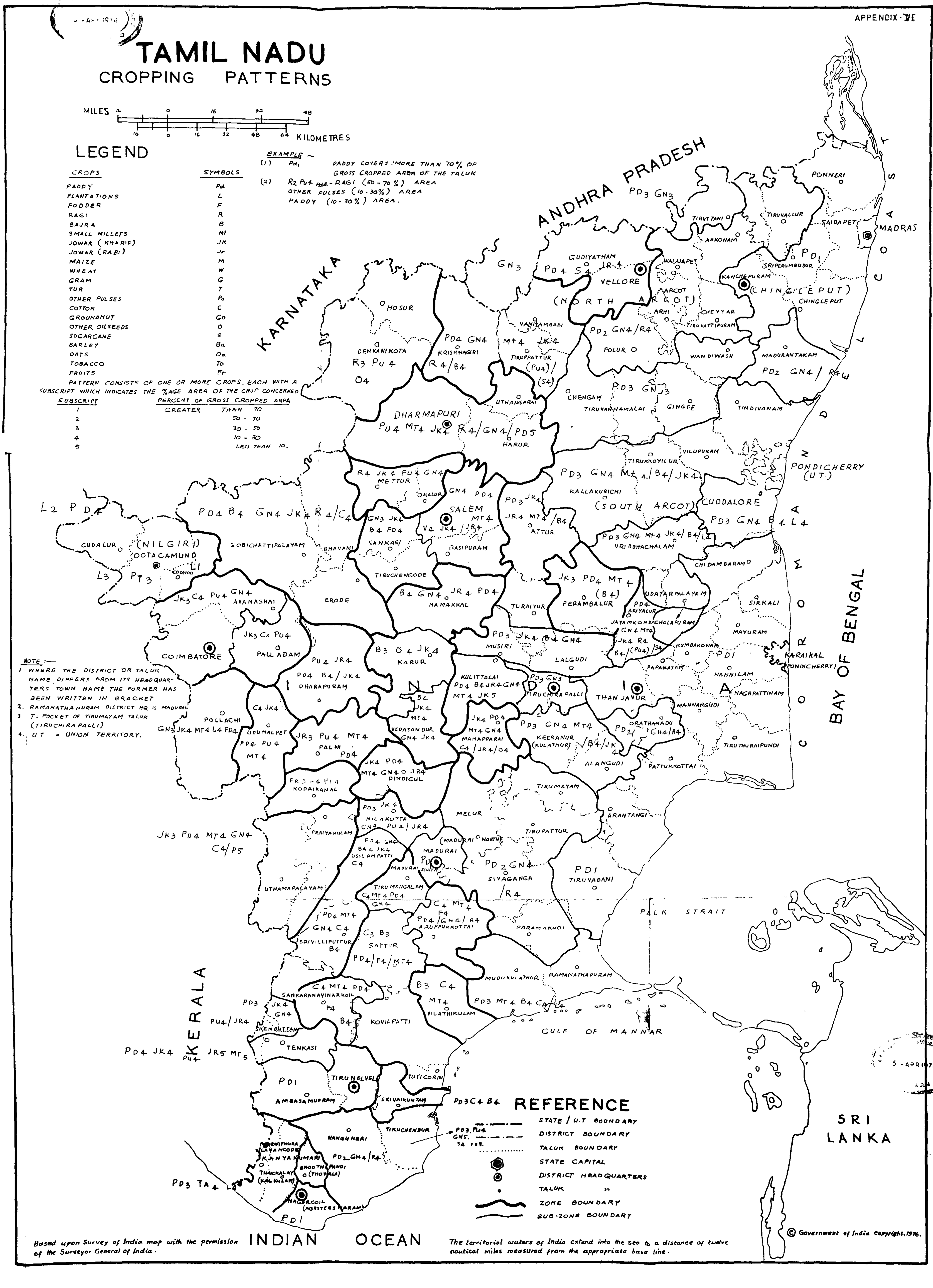
ERRATA

RAINFALL AND CROPPING PATTERNS

Volume XIV

TAMIL NADU

Page No.	Paragraph/Table/ Appendix No.	Line	As printed	As desired
(1)	(2)	(3)	(4)	(5)
1	1 ·2 (col. 2)	11	Commissions	Commission
1	2 ·2	1	India	Indian
3		6 after the table	30-51	30-50
4	3 ·1	8	ess than	less than
5	3 ·4 (col. 2)	18 from top	palli	lli
7	3 ·8	6	37 ·38°.	37-38°
7	3 ·8 (Col. 2)	13	normals	normals of
9	4 ·1	5	sidapet	Saidapet
10	4 ·15	9	by about	by
10	4 ·27	last	over 4 ·50	about 400
12	4 ·41	11	southermost	southernmost
12	4 ·41	14	km. In	km in
12	4 ·41	2	nut, small	nut. Small
12	4 ·50	7	bator	batore
13	4 ·51	7	much	is much
13	4 ·52	5	Srivaikuntham	the
13	Table 11	footnote	district	district yield
13	4 ·59	1	male	male and
13	4 ·60	col. 2, row 2 of table	Dharmapuram	Dharapuram
13	4 ·62	3	account	accounts
16	4 ·89	12	alluviam	alluvium
17	4 ·94	4	chengleput and 175	chingleput and 174
17	4 ·96	col. 1 line 3 of table	$Jk_3 C_4 Pu_5 Gn_4$	$Jk_3 C_4 Pu_4 Gn_4$
17	4 ·97	9	rest of	rest
18	4 ·104	last	alluvuim	alluvium
18	4 ·105	1	areas	area
18	4 ·108	16	more significant extent 24 percent of the cropped	In one taluk viz Srivilliputhur the crop is grown to a
19	4 ·114	3	in	in 44
19	Table 19	col. 4 heading	each	cent
20	4 ·124	2	large	larger
20	4 ·124	4	taluks	in other taluks
20	4 ·130	col. 1, row 2 of table	Total	total pulses
20	4 ·130	last	42	43
23	Appendix 1	col. 1 Rainfall Zone V	Vridhachalam	Virudhachalam
24	Appendix 1	col. 1 Rainfall Zone X	Dharmapuram	Dharapuram
27	Appendix 2	Footnote	Figure	Figures
29	Appendix 2	col. 1 Rainfall Zone X	Dharamapuram	Dharapuram
34	Appendix 3	col. 3 Rainfall Zone X	Dharmapuram	Dharapuram
36	Appendix 3	col. 1 row 4	$Jk_4 C_4 Pu_5 Gn_4$	$Jk_4 C_4 Pu_4 Gn_4$
38	Appendix 4	col. 1 Rainfall Zone V	Vriudhachalam	Virudhachalam


TAMIL NADU
CROPPING PATTERNS
MILES 16 0 16 32 48
16 0 16 32 48 64 KILOMETRES
LEGEND
CROPS SYMBOLS
PADDY Pd
PLANTATIONS L
FODDER F
RAGI R
BAJRA B
SMALL MILLETS Mt
JOWAR (KHARIF) JK
JOWAR (RABI) Jr
MAIZE M
WHEAT W
GRAM G
TUR T
OTHER PULSES Pu
COTTON C
GROUNDNUT Gn
OTHER OILSEEDS O
SUGARCANE S
BARLEY Ba
OATS Oa
TOBACCO To
FRUITS Fr
PATTERN CONSISTS OF ONE OR MORE CROPS, EACH WITH A SUBSCRIPT WHICH INDICATES THE %AGE AREA OF THE CROP CONCERNED
SUBSCRIPT PERCENT OF GROSS CROPPED AREA
1 GREATER THAN 70
2 50 - 70
3 30 - 50
4 10 - 30
5 LESS THAN 10.
EXAMPLE ~
(1) Pd1 PADDY COVERS MORE THAN 70% OF GROSS CROPPED AREA OF THE TALUK
(2) R2 Pu4 Pd4 - RAGI (50 - 70%) AREA OTHER PULSES (10-30%) AREA PADDY (10-30%) AREA.
NOTE :-
1 WHERE THE DISTRICT OR TALUK NAME DIFFERS FROM ITS HEADQUARTERS TOWN NAME THE FORMER HAS BEEN WRITTEN IN BRACKET
2 RAMANATHAPURAM DISTRICT HQ IS MADURAI
3 T: POCKET OF TIRUMAYAM TALUK (TIRUCHIRAPALLI)
4. UT = UNION TERRITORY.
REFERENCE
STATE / U.T BOUNDARY
DISTRICT BOUNDARY
TALUK BOUNDARY
STATE CAPITAL
DISTRICT HEADQUARTERS
TALUK "
ZONE BOUNDARY
SUB-ZONE BOUNDARY
ANDHRA PRADESH
KARNATAKA
KERALA
BAY OF BENGAL
INDIAN OCEAN
PALK STRAIT
GULF OF MANNAR
SRI LANKA
COROMANDEL COAST
MADRAS
PONDICHERRY (U.T.)
KARAIKAL (PONDICHERRY)
PONNERI
TIRUVALLUR
SAIDAPET
TIRUTTANI
ARKONAM
SRIPERUMBUDUR
KANCHEPURAM
(CHINGLEPUT)
CHINGLEPUT
PD1
WALAJAPET
GUDIYATHAM
VELLORE
(NORTH ARCOT)
ARCOT
ARNI
CHEYYAR
TIRUVATTIPURAM
WANDIWASH
MADURANTAKAM
PD2 GN4 / R4
PD3 GN3
PD4 S4 JR4
GN3
HOSUR
DENKANIKOTA
R3 Pu4 O4
KRISHNAGIRI
PD4 GN4 R4/B4
VANIYAMBADI
MT4 JK4
TIRUPPATTUR (Pu4)/(S4)
PD2 GN4/R4
POLUR
CHENGAM
TIRUVANNAMALAI
GINGEE
PD3 GN3
TINDIVANAM
UTHANGARAI
DHARMAPURI
Pu4 MT4 JK4 R4/GN4/PD5
HARUR
VILUPURAM
TIRUKKOYILUR
PD3 GN4 MT4/B4/JK4
KALLAKURICHI
(SOUTH ARCOT)
CUDDALORE
PD3 GN4 B4 L4
PD3 GN4 MT4 JK4/B4/L4
VRIDDHACHALAM
CHIDAMBARAM
R4 JK4 Pu4 GN4
METTUR
OMALUR
SALEM
GN4 PD4 MT4
V4 JK4/JR4
GN3 JK4 B4 PD4
SANKARI
RASIPURAM
TIRUCHENGODE
BHAVANI
PD3 JK4 JR4 MT4/B4
ATTUR
L2 PD4
PD4 B4 GN4 JK4 R4/C4
GUDALUR
(NILGIRI)
OOTACAMUND
COONOOR
L1
L3
PT3
GOBICHETTIPALAYAM
ERODE
B4 GN4 JR4 PD4
NAMAKKAL
JK3 PD4 MT4 (B4)
PERAMBALUR
TURAIYUR
UDAYARPALAYAM
PD4 ARIYALUR
JAYAMKONDACHOLAPURAM
GN4 MT4
JK4 R4 B4/(Pu4)/S4
SIRKALI
MAYURAM
KUMBAKONAM
PAPANASAM
PD1
NANNILAM
NAGAPPATTINAM
JK3 C4 Pu4 GN4
AVANASHAI
JK3 Cn Pu4
PALLADAM
COIMBATORE
PU4 JR4
PU4 B4/JK4
DHARAPURAM
B3 G4 JK4
KARUR
PD3 JK4 B4 GN4
MUSIRI
LALGUDI
KULITTALAI
PD4 B4 JR4 GN4 MT4 JK5
PD3 GN3
TIRUCHIRAPALLI
THANJAVUR
MANNARGUDI
ORATHANADU
PD2 GN4/R4
TIRUTHURAIPUNDI
POLLACHI
GN3 JK4 MT4 L4 PD4
C4 JK4
UDUMALPET
PD4 PU4 MT4
JR3 PU4 MT4
PALNI
PD4
B4 JK4 MT4
VEDASANDUR
GN4 JK4
JK4 PD4
MT4 GN4
MANAPPARAI
C4/JR4/O4
PD3 GN4 MT4
KEERANUR (KULATHUR)
B4/JK4
ALANGUDI
PATTUKKOTTAI
JK4 PD4
MT4 GN4 O JR4
DINDIGUL
FR3 - 4 P14
KODAIKANAL
JK3 PD4 MT4 GN4 C4/P5
PERIYAKULAM
PD3 JK4
NILAKOTTA
GN4 PU4/JR4
PD4 GN4
B4 JK4
USILAMPATTI
C4
MELUR
TIRUMAYAM
ARANTANGI
(MADURAI NORTH)
MADURAI
MADURAI SOUTH
TIRUPATTUR
PD2 GN4
SIVAGANGA
/R4
PD1
TIRUVADANI
UTHAMAPALAYAM
TIRUMANGALAM
C4 MT4 PD4
GN4
C4 MT4
F4
PD4/GN4/B4
ARUPPUKKOTTAI
PARAMAKUDI
PD4 MT4
GN4 C4
SRIVILLIPUTTUR
B4
C3 B3
SATTUR
PD4/F4/MT4
MUDUKULATHUR
RAMANATHAPURAM
B3 C4 MT4
VILATHIKULAM
PD3 MT4 B4 C4/L4
C4 MT4 PD4
SANKARANAYINARKOIL
F4
B4
KOVILPATTI
PD3
JK4
GN4
PU4/JR4
SHENBUTTAH
TENKASI
PD4 JK4 Pu4 JR5 MT5
PD1
AMBASAMUDRAM
TIRUNELVELI
TUTICORIN
SRIVAIKUNTAM
PD3C4 B4
PD3 Pu4 GN5 S4 FR5.
NANGUNERI
TIRUCHENDUR
PD2 GN4/R4
KANYAKUMARI
VILAVANCODE
THUCKALAY (KALKULAM)
BHOOTHAPANDI (THOVALA)
NAGERCOIL (AGASTEESWARAM)
PD3 TA4 L4
PD1
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TAMIL NADU

LIVESTOCK PATTERNS

LEGEND

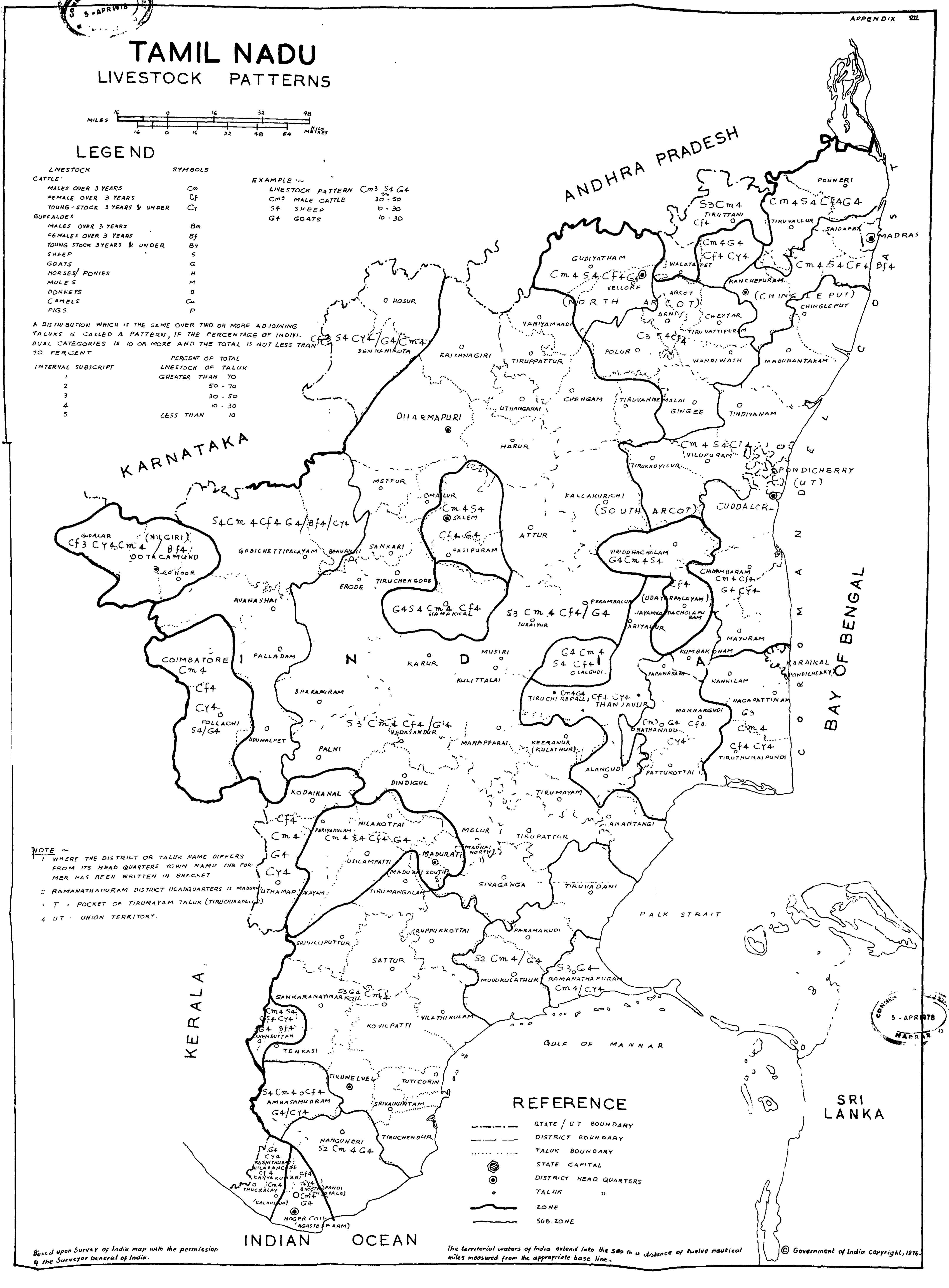
LIVESTOCK	SYMBOLS
CATTLE	
MALES OVER 3 YEARS	Cm
FEMALE OVER 3 YEARS	Cf
YOUNG-STOCK 3 YEARS & UNDER	Cy
BUFFALOES	
MALES OVER 3 YEARS	Bm
FEMALES OVER 3 YEARS	Bf
YOUNG STOCK 3 YEARS & UNDER	By
SHEEP	S
GOATS	G
HORSES/ PONIES	H
MULES	M
DONKEYS	D
CAMELS	Ca
PIGS	P

EXAMPLE ~

		%
LIVESTOCK PATTERN Cm3 S4 G4		
Cm3	MALE CATTLE	30 - 50
S4	SHEEP	10 - 30
G4	GOATS	10 - 30

A DISTRIBUTION WHICH IS THE SAME OVER TWO OR MORE ADJOINING TALUKS IS CALLED A PATTERN, IF THE PERCENTAGE OF INDIVIDUAL CATEGORIES IS 10 OR MORE AND THE TOTAL IS NOT LESS THAN 70 PERCENT

INTERVAL SUBSCRIPT	PERCENT OF TOTAL LIVESTOCK OF TALUK
1	GREATER THAN 70
2	50 - 70
3	30 - 50
4	10 - 30
5	LESS THAN 10



NOTE ~

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3. T · POCKET OF TIRUMAYAM TALUK (TIRUCHIRAPALLI)
4. UT · UNION TERRITORY.

REFERENCE

- STATE / UT BOUNDARY
- DISTRICT BOUNDARY
- TALUK BOUNDARY
- STATE CAPITAL
- DISTRICT HEAD QUARTERS
- TALUK "
- ZONE
- SUB-ZONE

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